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Departments of Business Administration, University of
California, Berkeley and Los Angeles.

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the authors and the articles—

THE WAGE-PRODUCTIVITY-PRICE ISSUE 42

A distinguished authority in productivity discusses here a major practical problem of business—should union wage negotiations be based on a “productivity formula”?

• JOHN W. KENDRICK, a noted authority on productivity, is an Associate Professor of Economics at George Washington University, and a consultant to the Bureau of the Budget. He recently completed a monograph for the National Bureau of Economic Research, *Productivity Trends in the United States*, scheduled for publication later this year (1960). Before going into research and teaching, he was an economist with the National Resources Planning Board and later was acting chief of the National Economics Division of the Department of Commerce.

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• LLOYD ULMAN is Professor of Economics and Industrial Relations, School of Business Administration and Department of Economics, University of California, Berkeley. He is the author of several articles and books including *The Rise of the National Trade Union*, Harvard University Press, 1955; “Unionism and Wages in Basic Steel,” *American Economic Review*, June, 1958.

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• GERHARD G. MUELLER is particularly well-versed in problems of overseas production and finance. He is a student of foreign trade and accounting, and is currently holding a Ford Foundation pre-doctoral fellowship in business administration at the University of California, Berkeley. Mr. Mueller emigrated from Germany to the United States in 1952. While in Germany, he served with the Rehabilitation Division of the U. S. High Commission. He has worked for several business firms, both in the United States and abroad.

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• **CYRIL O'DONNELL** has had many years experience in business and academic fields. He is a consultant to several private firms and government agencies, and has served as an industrial engineer for the P. R. Mallory Company, Inc., and as President of the Indianapolis Distributing Company. Mr. O'Donnell is now Professor of Business Organization and Policy, and Director, Case Development Program, Graduate School of Business Administration, University of California, Los Angeles. He is the author of *Business Management* and co-author of *Principles of Management*.

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• **KEITH DAVIS**, management consultant, author, educator, is presently serving as Professor and Chairman of the Department of Management, College of Business Administration, Arizona State University. He has served as a consultant for such firms as the Texas Company, Firestone Tire and Rubber Company, Quaker Oats Company, and others. He is the author of over forty professional articles and three books on the subject of management.

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• **COL. LYNDALL F. URWICK** is internationally known for his contribution to management science. During his distinguished career, he has served as a professional management consultant, chairman of the London consulting firm which he founded in 1934, director of the International Management Institute in Geneva, vice-chairman of the British Institute of Management, and chairman of the "Urwick Committee" which established in 1947 a national syllabus for the teaching of management in Britain. He has done much work in the United States and elsewhere at the invitation of such bodies as the American Management Association and the Indian Planning Commission for an Institute of Management. Since 1951, he has retired from executive work to devote his time to lecturing and writing about the art of management.

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If your firm is not realizing maximum profits or savings from capital expenditures, the fault may lie in your control procedures. This article suggests some new devices to ensure adequate managerial control over the spending process.

• ERICH A. HELFERT has specialized in the study of capital expenditure management. He is currently an Assistant Professor on the staff of the Harvard Graduate School of Business Administration and has taught at San Francisco State College. In addition to his academic career, he spent several years as an accountant with a CPA firm in Nevada. He is a member of the American Finance Association and the American Accounting Association.



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What Do We Mean by Research and Development?

DAVID NOVICK

This article shows that perhaps one of the most important research projects of the nation and of every individual business may be research into the content of current research and development.

It has become fashionable to speak of the need for more research and development. There has been a loud clamor for more military activity in this field in recent years so that we may be better able to protect ourselves. In business it has become "the thing to do." The outstanding present success achieved by many companies is often attributed chiefly to their extensive and expensive past research programs. There is a seemingly blind belief that by doing more research, we will outrun our international competitors in the military race or, on the commercial side, make larger and larger profits.

Numerous studies emphasize the recent marked expansion in R&D effort. Changes in budgetary practice by the Department of Defense have given new importance to the rate of growth in this activity. We now speak glowingly of the \$3.7 billion R&D expenditures budgeted for fiscal 1960 when comparing it with \$650 million identifiable as military research and development outlays in fiscal 1950. In the same way, we talk of business expansion of R&D expenditures from about \$166 million in 1930 to \$1 billion several years ago and to \$10 billion today.

I have no quarrel with the desire or need for substantial expenditures for research and development. However, I do feel strongly that deciding how much is enough will depend not only on objectives and accomplishments, but also in a large degree upon the

appropriateness and uniformity of the definitions used in describing research and development activities. Currently available information is not adequate for such measurements, and there is a real need for clarification of what these magic words mean.

Just *how* are the dollars being spent? Are we really spending *more* dollars in essential research and development areas, or are we merely reclassifying traditional outlays? What are we doing and what is the real nature of the changes these expenditures promise? Only with such knowledge can we decide whether we are doing the right things and in the proper quantities.

This article examines the current confusion in R&D classification, the available statistics of R&D growth and problems in using the data, and attempts to develop a useful scheme of identification for various types of research, development, test, and evaluation. Better classification and measurements of R&D should be of value to those who must make resource allocation decisions. For such people, proper classification of R&D is of critical importance to permit identification of the kind of results which might be expected from each major R&D grouping, and to provide a better basis for allocating scarce resources to R&D among other urgent programs. This problem is as critical to an individual business as to government. Survival may depend upon the way it is solved.

TABLE I
FIVE CLASSIFICATIONS OF RESEARCH AND DEVELOPMENT NOW BEING USED BY INDUSTRY

A	B	C	D	E
Search for new scientific facts and principles not connected with current products	Fundamental research	Fundamental research	Expanding general knowledge	(No reference to basic, fundamental or general knowledge research)
Search for knowledge we know we need	Development of new products and processes	Research on new products	Searching for new products and processes	(Begins with) Selecting fruits of current scientific knowledge
Development of characteristics of products we will be making 5 to 10 years from now				
Standard product development	Improvement of present products	Application research	Improving existing products and processes	Screening business specifications
Customer ordered development for custom-tailored equipment			Developing new uses for known products	Development and testing
Does not include sales engineering, quality control or other routine nonpracticing engineering activities		<i>Pilot plant research</i> <i>Production research</i> Sales research	Solving technical problems in the manufacture and maintenance of existing products	Commercialization

Confused Classification of Research and Development

Present classifications of research and development, both at the national level and in the accounting of individual companies, is confused and may be downright misleading. It is elemental in any sober analysis of research activity to recognize this muddled nomenclature.

Dr. Merle A. Tuve said in a presentation that I will call the keynote of a meeting on basic research held under the auspices of the National Academy of Sciences:

"... all of us (scientists) have contributed to a more or less purposeful confusion in our use of the words 'basic research.' We have lumped under 'research and development' so many huge technological activities in the national budget, and correspondingly in corporation budgets and elsewhere, that the figures have become practically meaningless."¹

Dr. Tuve was concerned with science and basic research. The same words can, in general, be applied across the board to the entire field of inquiry and experimentation which is summarized as research and development, or research, development, test, and evaluation.

Dr. J. A. Hutcheson, Vice-President, Westinghouse Electric Corporation, made a most revealing statement in announcing his company's \$185 million 1959 budget for R&D. He pointed out that to measure research spending as a percentage of sales is meaningless unless the objectives are defined and the figures broken down. He defined and classified his company's proposed research program as follows: 1.9 percent, or \$3.5 million, for "Blue Sky" research not connected in any way with current products but promising for the long-range future; 3.2 percent, or \$6 million, for long-range major development programs aimed at identifying

characteristics of products the company believes it will be making five to ten years from now; 6.4 percent, or \$12 million, for searching for new knowledge known to be needed based on past research; 9.6 percent, or \$30 million, for standard product development to up-date and improve existing products; and 78.9 percent, or \$133.5 million, for development to customers' orders for customer-tailored equipment.

When so defined, it becomes apparent that the Westinghouse program can be broken down into several different categories to yield quite different amounts of effort in advanced or long-range research and development as compared with product improvement and application, or with short-range research or development.

For most firms, general statements of X million dollars for research and development are sadly in error as a measure of effort applied to advancing science. In many companies the terms research and development include (and in some cases are entirely for) marketing and advertising, packaging and routing, and other activities which are research and development but not the kind that is the implied magic of R&D, that is, the work which makes major contributions to scientific goals. Classifications used by five major manufacturing firms are shown in Table I. The wide range of difference in the content and object of what is called R&D is obvious when one compares column A in Table I with column D or E.

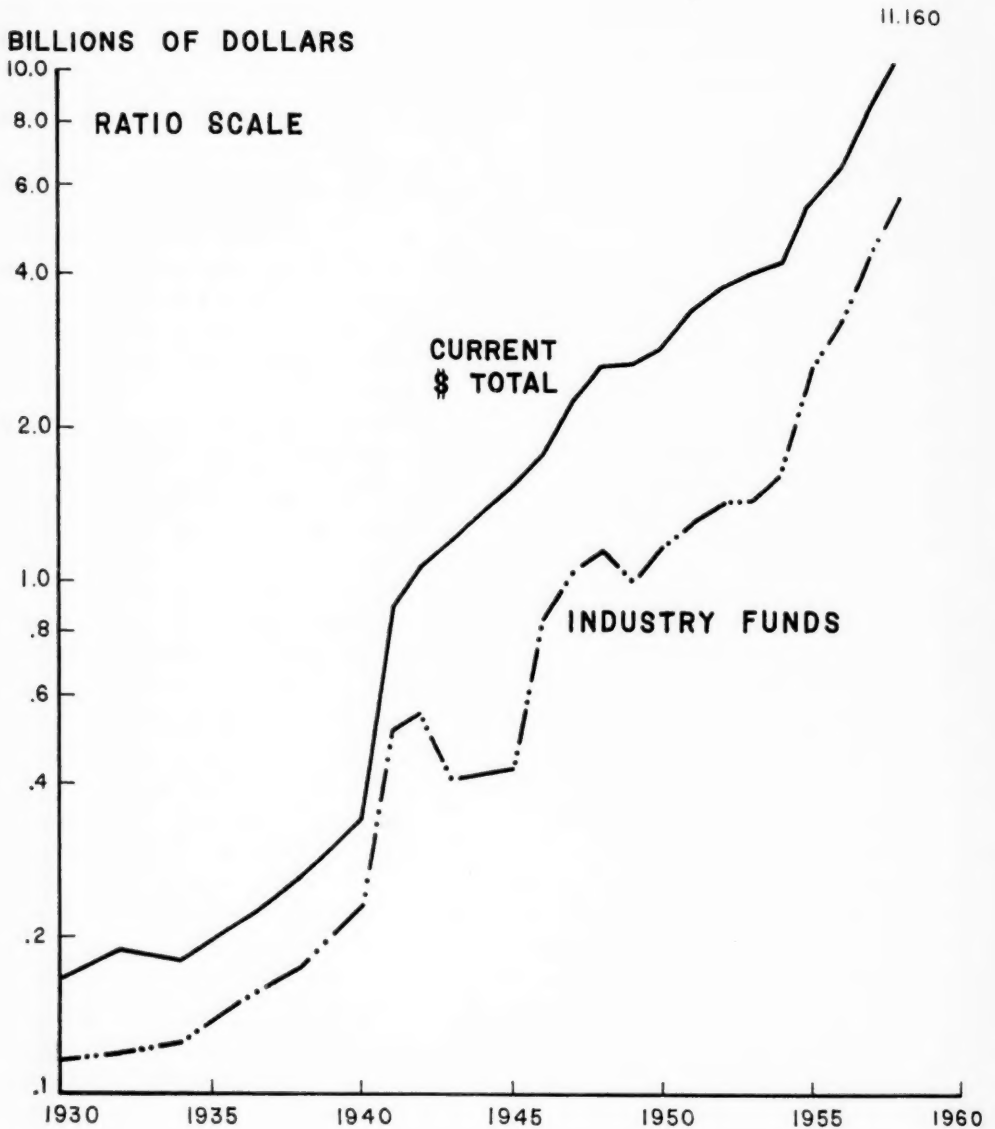
There is such great diversity in the resources consumed and in the things produced by the many industrial firms and government agencies which carry on research, development, test, and evaluation that it would be surprising if common accounting practices were followed to identify monies spent for them.² A wide range of dollar figures for research, development, test, and

¹ *Symposium on Basic Research*, under the auspices of the National Academy of Sciences, the American Association for the Advancement of Science, and the Alfred P. Sloan Foundation, May 14-16, 1959.

² See "Accounting Problems in the Renegotiation Process and the Renegotiation Process as an Accounting Problem," Charles G. Gillette, *UCLA Conference on Renegotiation*, 1959; and "Accounting for Research and Development Costs," *NACA Bulletin*, June 1955, Research Series No. 29.

FIGURE 1

RESEARCH AND DEVELOPMENT EXPENDITURES



SOURCES:

- 1930-1940 Vannevar Bush, *Science the Endless Frontier*, p. 80 as adjusted in Steelman report, vol. I, p. 10.
- 1941-1952 Department of Defense, *The Growth of Scientific Research and Development*, p. 10.
- 1953-1958 Statistical Abstract of the U. S., p. 500, and National Science Foundation, *Reviews of Data on Research and Development*, nos. 1, 10, 13.
- 1959- Total industry figure of 11.160 estimated from National Science Foundation mid-year data.

evaluation can be developed depending on how the individual firms identify and account for resource use by divisions, departments, and other organizational units down to the level of the individual scientist, engineer, technician, or clerk. Since there is no common or uniform practice in establishing the basis for these charges, it is difficult to say whether or not the \$10 billion national R&D expenditure figure commonly bandied about for the year 1959 is actually a significant measure of national effort devoted to expanding science, engineering, and technology.

Clearly, there is no uniformity either in the use of or accounting for R&D expenditures. This is true nationally as well as for individual business firms. Because the objectives for which aggregate data on R&D expenditures are so important, more attention should be devoted to the question of how reliable they are as measures.

Measures of the Growth of R&D Expenditures

The best estimates available show a tremendous growth of R&D expenditures in the past several decades. Between 1930 and 1940, outlays rose from \$166 million to \$345 million, or more than double. In the next year, when defense spending for R&D became significant, the total more than doubled again to \$900 million. By 1950, R&D was three times its 1941 level, and since then it has more than tripled. For 1959, the R&D expenditure figure is estimated at \$10 billion. Thus our present outlays for R&D are described as being sixty times greater than thirty years ago.

There is much uncertainty about the extent of this statistical growth and the real meaning of the increased outlays. Data on this subject exist among scattered sources and are not entirely comparable.³ The jump

from 1940 to 1941, although reflecting an actual leap in R&D expenditures, may also reflect a statistical discontinuity. The break in the trend after 1954, as indicated in Figure I, reflects the fact that the Revenue Act of 1954 gave corporations liberty to "expense" R&D outlays.

Recent changes in classification in the Department of Defense are responsible for an apparent upward movement in the level of R&D spending for 1960 as compared with the immediately preceding period. Prior to the President's budget proposals for the fiscal year 1960, it was common practice to identify military research and development only with the monies in a specific budget program bearing that title. Starting with fiscal year 1960, the executive budget definition has been expanded to read Research, Development, Test, and Evaluation and is being applied to new fund pockets. This now includes monies identified not only in the heretofore conventional R&D account, but also certain other expenditures traditionally identified as procurement and production which are now labeled as Development, Test, and Evaluation parts of R&D. One important lesson to be learned from the Department of Defense nomenclature is that there are a great many classes of research, development, test, and evaluation. Each of them serves a different purpose.

Although the great expansion of R&D cannot, of course, be all attributed to statistical delusion, there is plenty of room for doubt as to what the data actually indicate in terms of research effort. It is evident that price changes tend to overstate the growth as measured by actual expenditures. To adjust the data properly for price changes, an index based on a combination of salaries of research personnel and the hardware used in R&D would have to be used. In the absence of such an index, I have adjusted the series by three different deflators, namely, engineers' salaries, producers' durable equipment, and Gross National Product. The results of using these three adjustment factors

³ The statistical material concerning R&D expenditures is not abundant. However, rather than list the various sources of available data the reader is referred to *Methodological Aspects of Statistics on Research and Development, Costs and Manpower*, National Science Foundation, NSF 59-36, Based on Papers Presented At ASA Meeting, December 1958, U. S. Government Printing Office, June 1959, Appendix A, "Selected Bibliography on Surveys of Research and Development," p. 67.

were not widely divergent. All roughly reduce the growth by about one-half! Thus, the sixty-fold increase between 1930 and 1958 is cut to a twenty-five to thirty-fold increase in real terms.

Another measure of growth is the change in the number of scientists and engineers engaged in research. This measure has the advantage of not being influenced by price changes and also of being unaffected by variations in accounting procedures. It has the further advantage (or disadvantage) of not reflecting changes in the hardware cost of R&D. From 1941 to 1952, the number of research engineers and scientists doubled—a somewhat slower growth than that of adjusted R&D outlays.

A major problem in measuring the growth of R&D activity, as well as in appraising its importance, is the ambiguity of the terms "research" and "development." The line of demarcation between development and production is a thin and elusive one, and may often be drawn in terms of company policy rather than any clear-cut definition of terms. Some of the growth in research and development may be the result of the new respectability which R&D has attained, and the consequent accounting shift of some activities into the R&D classification from other classifications. Some growth undoubtedly results from what Dr. Tuve, in the presentation referred to earlier, calls "Big Wheel," and "Big Deal" effects. This is the practice of "blowing up" a research project, which probably should cost from \$25,000 to \$50,000, to estimates from \$250,000 to \$500,000 in order to make it look important and make it easier to "sell."

Comparisons of industry R&D are particularly susceptible to variations in the definition of research and development. Different industries engage in a wide variety of activities falling under the R&D label. Even within an industry, the data must be interpreted with caution. The aircraft industry, for example, which depends heavily on government funds, will be influenced by the De-

partment of Defense's position on R&D, and will tend to classify costs according to the availability of funds in the defense categories.

Confusion of terminology leads to the inclusion in research and development expenditures every and any kind of activity where either the person doing the work or those paying for it choose to use the label of research. For example, the cost of taking a census is included in the over-all federal government R&D estimates. To be sure, census taking is an important research function, but it is substantially different from many other kinds of research.

On the basis of present classifications, R&D aggregations will include marketing research whether in a university, a manufacturing company, or a publishing or advertising agency, since all of these are likely to be called research. On the other hand, they will not likely identify as research the effort of every surgeon or physician treating an individual case of cancer even though the doctors may add significantly to our sum of knowledge of the disease. The reason is that the medical profession calls this "practice" rather than "research."

The aggregate R&D data collected today embraces a very wide spectrum, from the purest type research to activities hardly worthy of either the name research or development. Moreover, some basic research activities of real significance may be excluded.

Current recognition of the need for more basic research has pointed up the paucity of information available (both quantitative and qualitative) on just how much effort is going into basic research. This gap is partly attributable to the difficulty in determining whether expenditures are being made for basic or applied research. Table II is a modest effort to demonstrate the historical quantitative relationship between basic and other research. (For the purpose of this Table, basic research is broadly defined as the search for new knowledge without reference to any particular practical application.)

TABLE II
CHANGES IN THE ROLE OF BASIC RESEARCH

Year	Basic as Percent of Total Research					
	Total	Government	Industry	University	Other	Large Foundations*
1939.....	..	..	..	..	..	96%
1946.....	..	..	..	..	..	75
1947.....	10%	9%	2%	78%	25%	..
1952.....	..	6	..	..	..	..
1953.....	8	6	4	46	76	65
1954.....	..	7	..	..	..	..
1955.....	..	7	..	..	..	..
1956.....	..	7	4	..	..	..
1957.....	7	8	3	..	..	..
1958.....	..	9	..	..	..	..
1959.....	..	8	..	..	..	..

* A sample of 77 large foundations which are part of the "Other" category.

Sources:

1947—Science and Public Policy vol. I (Steelman Report to President), p. 12.
1953—National Science Foundation—Reviews of Data on Research and Development, No. 5, p. 3. Government—Federal Funds for Science, VII, National Science Foundation, p. 16. Large Foundations—Scientific Research Expenditures by the Large Private Foundations, National Science Foundation, p. 15.
1957—Waterman, Alan T. "Basic Research in the U.S." 5/14-15-16/59.
1956, 1957—Industry—National Science Foundation—Reviews of Data on Research and Development, No. 14, p. 5.

Between 1947 and 1957, estimates of the share of total research devoted to basic research declined from 10 to 7 percent. Government's support of basic research is proportionately about the same now as it was in 1947. The relative drop in basic research seems to have occurred chiefly in the universities. It should be noted, however, that an important segment of basic research done at universities never enters the statistics. Research done by professors and graduate students is often not paid in monetary terms and is not, therefore, included in tabulations.

Although this is by no means an exhaustive analysis of available data on R&D, it makes clear real difficulties which lie in the way of anyone trying to measure R&D with existing data or interpreting what has been measured. Although our national R&D expenditures have risen statistically from \$166 million in 1930 to \$10 billion in 1959, there is real doubt about the extent to which the spread measures growth. It may very well be that practically all of this increase is in the application of principles established thirty or more years ago and that the effort devoted to the search for BIG IDEAS is not significantly

larger today than it was in 1930 or in earlier periods.

Whatever the final count may show, one thing is obvious. The \$10 billion figure includes everything from product and market testing to academic research in psychology and accounting, cyclotrons and bevatrons, as well as the support of some scientists engaged in pure research. I am, therefore, highly dubious of the usefulness of existing data for meaningful guidance to those called on to make allocation decisions in the R&D area.

In light of the present confusion of R&D nomenclature and the statistics that presumably measure the effort, a new codification and measurement clearly is needed. The remainder of this paper deals with this problem.

Science, Research, and Development

Although we all assume that we know what we mean when we speak of science, basic research, applied research, development, test and evaluation, it is not likely that the meaning would be the same to a civil engineer, a nuclear physicist or a marketing

expert, to list only a few of the many thousands of possible users of these terms. Dictionaries and encyclopedias try to resolve this problem, but they accomplish it only by using words like "observing and classifying facts," or "discovery and formulation of verifiable laws," without further description of the facts or the laws, research and experimentation, or even the subject content of science as they describe it.

A literature search establishes clearly why it is easy for one man's research to be another fellow's development, or for an individual who considers himself a scientist to be described by others as an engineer, a technician, or even just a businessman. The following definition illustrates the point:⁴

"Research has become very popular in the United States since the outbreak of World War II. As Henry D. Smyth has observed, the idea that the object of research is new knowledge does not seem to be widely understood and 'a schoolboy looking up a word in the dictionary is said to be doing research.' Indeed it has been debased even further. Research is frequently used to describe reading by those to whom reading apparently is a *recherché* activity, and for many a graduate student it is a euphemism for wholesale plagiarism. The word needs a rest or at least less promiscuous handling."

In developing a description of the subject area, the meaning of "science" seems the obvious starting point, since it is the spring from which flow research and development in any and all of their ramifications. Much of our confusion arises from lack of recognition of the time and evolution factors which characterize the downstream changes as the flow proceeds from the spring of science to the ocean of everyday application. The "harebrained ideas" of the science of one period are the "sound" practical and useful tools of a later period.

⁴ Bergen and Cornelia Evans, *Dictionary of Contemporary American Usage* (New York: Random House, 1957).

Poincaré spoke out in praise of the "harebrained" who are at the spring of science and whom he called "disinterested fools": "What these fools did," he said, "was to save their successors the trouble of thinking. If they had worked solely with a view to immediate application, they would have left nothing behind them, and in face of a new requirement, all would have had to be done again." Although we are not now likely to refer to Darwin, Einstein, or Newton as "harebrained" or "disinterested fools," the original work of all three had the identifying mark of seeking understanding of the universe and not a particular use or uses for the principles which were propounded.

In this context, we can say science seeks an understanding of nature, and the appliers of the knowledge made available by basic research use that knowledge to alter or change nature. Since the application—particularly in its early stages—bears a strong resemblance to pure science, it is not easy to distinguish between them. Kettering, whose name is associated with so many of our present comforts and who established many of the standards for industrial research, said that science provided the warp threads on which progress is made by engineers and research in industry. The latter effort provides the short woof threads which tie the long warp threads together.⁵

He pointed out that in the university only two factors were involved in scientific research—(1) matter, and (2) energy. In industry, in his opinion, research involved four factors—(1) matter, (2) energy, *plus* (3) economics, and (4) psychology. As he put it, "Industry research must partake as much of economic horse-sense as science."

Kettering did not limit himself to the woof threads. In his later years he was very much concerned with the warp. He established a solar laboratory aimed at "how to catch this energy from the sun" and a magnetics labora-

⁵ T. A. Boyd, *Professional Amateur: The Biography of Charles Franklin Kettering* (New York: E. P. Dutton & Co., Inc., 1957). All references to Kettering are based on this book.

tory to try to determine "how it is that magnetism—or gravitation or radiation or electrostatically charged particles—can act through what appears to be empty space." His ideas on method also kept crossing from the short wool threads to the stronger and longer ones of the warp.

He said that research in industry is not justified by general contributions to human knowledge but by picking the right problems. In doing this, Kettering nonetheless insisted that the "laboratory be devoted solely to pioneering research free from the hindrance and interruptions always present in a manufacturing concern." The strength of this conviction is demonstrated in his 1919 contract with General Motors in which he agreed to establish a research laboratory for GM. In that contract, he stipulated "the research laboratory should have no direct responsibility for the products of General Motors but be free to do forward-looking research." It was in this laboratory that high-octane gasoline, refrigerants, new paints, and diesel engines were the outstanding inventions. It is clear from everything that Kettering said and did, however, that his objective was to get applications that people would buy and that would make money for the discoverers and manufacturers. This background is essential to an understanding of much of the confusion about the many varieties and kinds of research.

Lack of knowing probable applications seems an appropriate starting point for science. If we look at the classifications now used, it is apparent that basic research is everyone's starting point and is characterized as *promise* for the long-range future. As we go down the list of activities in Table I, possible application becomes more important whether for customer-ordered development for custom-tailored equipment, pilot-plant research, production research, sales research, solving technical problems in manufacture and maintenance of existing products, or commercialization. Application and the degree of certainty assumed in attaining it

seem to be likely standards for setting up a more useful classification.

This approach facilitates the setting of milestones from which the nation or an individual company may better determine where it is in the R&D process. It also provides a better framework for making decisions about the future.

A New R&D Classification

One recent addition to commonplace statements is: "In lead time, that is, from basic concept to operations, the Soviet Union is way ahead of us. It takes us 10 years, but the Soviet Union does it in about 5 years." This statement seems simple and straightforward until one raises the question of what measurement was used to determine what each country accomplishes in these markedly different time periods.⁶ In this case it is made more complicated by the frequently voiced corollaries: "We know that we are ahead of the USSR in basic research and we are far ahead of them in production." Taken together, these statements seemingly mean that the Soviet is ahead of us only in administering the implementing actions and that this is the significant difference. I wonder if that is the case?

Like most other Americans, I know very little about the USSR. However, articles in magazines and newspapers, and friends who have been in Russia or who have talked to Russian visitors in the last few years, lead me to believe that we are not ahead of them in production techniques—probably the easier one of the two to appraise—and we are not significantly ahead in basic research. It seems to me that lead time in the USSR is just about the same as in the U. S. If they are ahead of us in getting final product, it is because they:

1. probably have a more direct approach,

⁶ For one aspect of the difference in "dating" practices, see Arnold Kramish, *The Soviet Union and the Atom: The "Secret" Phase*, The RAND Corporation, Research Memorandum RM-1896, 11 April 1957; and *The Soviet Union and the Atom: Toward Nuclear Maturity*, The RAND Corporation, Research Memorandum RM-2163, April 25, 1958, pp. 23-25.

that is, place more emphasis on early application than on understanding;

2. are more willing to gamble either on resource cost or on final performance⁷;
3. seem to freeze design for production and make fewer changes once a decision to produce for operational use has been made; and
4. have continuity in program and personnel in complete systems, components, or basic research.

If these are in fact the practice in the USSR, they indeed have shortened lead time.

We in the U.S. tend to seek full understanding of a principle before going all out for it. Although we gambled on both resource cost and product performance in attaining the heights of achievement that marked our World War II efforts, we have been cautious since 1945. Our desire for perfection and certainty also leads to continuous changes or modifications in equipment even after a decision has been made to procure for operation.

Lead time in a physical sense is a real thing and is not easily shortened.⁸ The changes which the USSR seemingly have introduced are both intellectual and administrative and are available to those who are willing to take risks. Understandingly or not, the Russians apparently push ahead—steadily and continuously; we seek assurance before making our commitments and proceed in a start-then-stop and stop-then-start manner.⁹

⁷ There are frequent references by the Russians in their conversations either in the USSR or in Canada and the USA which would indicate that on scientific equipment, like the bevatron, or on military equipment, such as aircraft or missiles, estimated performance is the basis of decision and after that determination the resources must be made available. Scientists and engineers report that the Russians seem willing to draw conclusions from small-scale tests representing either the product or the conditions under which it will operate.

⁸ David Novick, *Lead-Time in Modern Weapons*, The RAND Corporation, Paper P-1240, December 26, 1957 (also published in the *Federal Expenditure Policy for Economic Growth and Stability*, Joint Economic Committee, Congress of the United States, 85th Congress, 1st Session, U. S. Government Printing Office, Washington, D.C., November 18-27, 1957); M. Anshen, D. Novick, and W. C. Truppner, *Wartime Production Controls* (New York: Columbia University Press, 1949), pp. 20-23.

⁹ David Novick, "Federal Spending for National Security," The RAND Corporation, Paper P-1197, De-

To get this difference more clearly in mind, we must better understand:

- (1) what we do in each one of the separate steps we lump in research and development;
- (2) what we can expect as the product of each stage of effort; and
- (3) probably most importantly, the degree of uncertainty—risk—that is associated with each of these levels of expectation.

A foundation for better understanding and use of this concept exists in a brief and oversimplified survey of the more than 50 years of research and development that brought us to our present stage in atomic energy. In this light, the following resume may be useful to straighten out today's confusion over R&D nomenclature.

Two principles have been the cornerstones of the structure of modern science.¹⁰ The first—that matter can be neither created nor destroyed but only altered in form—was enunciated in the eighteenth century and led to the principle known as the "law of conservation of mass." The second—that energy can be neither created nor destroyed but only altered in form—emerged in the nineteenth century and is known as the "law of conservation of energy." It is now known that the two laws are, in fact, two phases of a single principle. We have discovered that energy may sometimes be converted into matter and matter into energy. Specifically, such a conversion is observed in the phenomenon of nuclear fission of uranium.

One conclusion of the theory of relativity was that the inertial mass of a moving body increased as its speed increased. To most

ember 4, 1957 (also published in the *Federal Expenditure Policy for Economic Growth and Stability*, Joint Economic Committee, Congress of the United States, 85th Congress, 1st Session, U. S. Government Printing Office, Washington, D.C., November 5, 1957; presented to the Subcommittee on Fiscal Policy, Joint Economic Committee, Congress of the United States, November 21, 1957).

¹⁰ See H. D. Smyth, *A General Account of the Development of Methods of Using Atomic Energy for Military Purposes Under the Auspices of the U. S. Government*, USGPO, 1945. Errors arising from condensation are mine. See also, Louis DeBroglie, *The Revolution in Physics*, The Noonday Press, 1956.

practical physicists and engineers this principle appeared a mathematical fiction of no practical importance. Even Einstein could hardly have foreseen the present application when he concluded that the amount of energy, E , equivalent to a mass m was given by the equation $E = mc^2$, where c is the velocity of light. If stated in actual numbers, the startling character of the principle is apparent. It shows that one kilogram (2.2 pounds) of matter, if converted entirely into energy, would give 25 billion kilowatt hours of energy. Compare this fantastic figure with the 8.5 kilowatt hours of heat energy which may be produced by burning an equal amount of coal.¹¹

In 1905, the possibility of initiating or controlling such a conversion in any practical way seemed very remote. By about 1930, however, evidence of the possibility of doing it began to appear. Radioactivity had been discovered by Becquerel in 1896 and studied by Pierre and Marie Curie, Rutherford, and many others. Evidence that different radioactive substances vary in their ionizing power had been observed in various laboratory experiments prior to 1905, and it was for this reason Einstein suggested that studies of radioactivity might show the equivalence of mass and energy.

In 1919, Rutherford showed that high-energy alpha particles could cause an alteration in the nucleus of an ordinary element—the proton concept. In the following decade, many similar experiments were performed with similar results, which, in 1932, added the neutron concept to our store of knowledge. That year also produced the positron and deuteron.

In 1934, Curie and Joliot reported that alpha-particle bombardment produced radioactive forms of boron, magnesium and aluminum. This stimulated similar experiments

all over the world, particularly the work of Fermi, which finally provided the key to the unlocking of the stable nucleus. It is a general principle of physics that work must be done on a stable system to break it up. Thus, if an assemblage of neutrons and protons is stable, energy must be applied to separate its particles. The energy released when calculated by the Einstein formula is tremendous. This knowledge made it worthwhile to explore the possibility of getting energy by combining protons and neutrons or by transmuting one kind of nucleus into another.

Rutherford (in 1919) and Cockcroft and Walton in Rutherford's laboratory (1932) showed the way. Subsequently, cyclotrons and Van DeGraff machines were used to attain high energies by accelerating ions. All of this indicated the probability of nuclear reaction, but there was still no guarantee of achieving or controlling it. Although no atomic power plants were built in the 1930's, there were many discoveries in nuclear physics and plenty of speculation. Bohr, Frisch, Meitner, Hahn, Fermi, and Peggam figure prominently in events leading up to a January 1939 conference on theoretical physics at Washington, D.C., at which alternative possibilities of obtaining fission and possible chain reaction were discussed.

By 1940, nuclear reaction had been studied intensively for over ten years. Publications and techniques were generally available, but the information was incomplete and frequently inaccurate. Although the fundamental principles were clear, the theory was full of unverified assumptions, and calculations were hard to make. Predictions made in 1940 by different physicists of equally high ability were often at variance. The subject was in all too many respects an art rather than a science.

It had been proved that mass and energy were equivalent; that the neutrons initiating fission of uranium reproduced themselves, and therefore a multiplying chain reaction might occur with explosive force. To be sure, no one knew whether the required conditions

¹¹ It has been suggested (not by H. D. Smyth) that Planck's *Quantum Hypothesis* propounded in 1901 was as important or even more significant than Einstein's theory. Planck's work on the "Quantum Hypothesis of Black-Body Radiation" and the substitution of a discontinuous hypothesis for the then accepted continuous concept is believed by some to have paved the way for the new work on the atom.

could be achieved, but many scientists had clear ideas about and possible solutions to the problem.

Experimental research was an integral part of the achievement of the nuclear fission process. Laboratory work frequently has preceded or paralleled theory in other basic discoveries. Because the equipment and workplace for the scientific laboratory is not readily differentiated from the activities of development and application, apparent similarity has caused much of the confusion in identifying engineering and technology (which measure their accomplishments in small units) as scientific effort (with its big promises for the future). The best illustration I have found of these inter-relationships is shown in Figure 2.

This description was developed by the Applied Physics Laboratory, but with appropriate modification in terminology, it applies to almost any cycle extending from initial concept to final operation. The significant feature of this schema is its identification of the interactions between needs, products nonavailable or in development, and basic research. Although it does identify the by-products which are accidental fea-

tures of this process, it does not include the testing and evaluation, which are major factors and which also interact on the steps identified in Figure 2. For that reason I have attempted to expand the APL schema as shown in Table III.

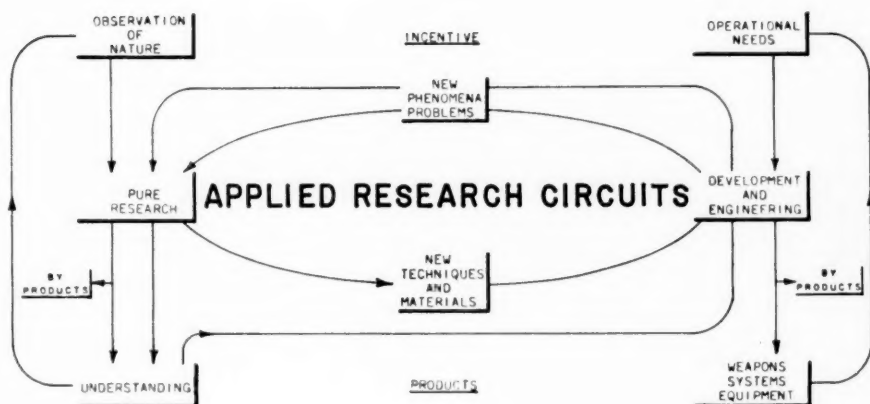
Since Table III is largely self-explanatory, there is no need to elaborate further the meaning of steps and promises for the future. I wish to say, however, that in my judgment, this classification can establish a better basis for useful national and company statistics on R&D. What is more, such facts, when accumulated on this framework, will be of high use to government and company executives who are faced with hard problems both in appraising and financing R&D.

Expenditure Estimates by R&D Steps

Earlier in this paper, I raised a question about how much of our R&D outlays were really used for new basic research as compared with other types of research. With our classification of Table III in mind, some useful comments may now be directed at this question.

In terms of the Westinghouse distribution of research and development effort refer-

FIGURE 2
REGENERATIVE CIRCUITS IN SCIENCE AND TECHNOLOGY



enced earlier, about 70 percent of what the nation is doing in R&D is in Step IV, about 26 percent in Step III, 3 percent in Step II and about 1 percent in Step I. Although the available data (briefly examined previously) do not permit quantitative analysis in specific terms, it is my guess that our \$10 billion in 1959 probably distributes as follows:

STEP	PROMISE	DOLLAR DISTRIBUTION
I	Brave New World	\$ 100,000,000
II	Possible use of new discovery	300,000,000
III	Application of new knowledge	2,600,000,000
IV	Improved application of existing knowledge . . .	6,000,000,000

These guesses may or may not be disturbing to those who view the future of the world as

a struggle for scientific achievement. They do disturb me.

One reason why the Step I, or Brave New World, outlay is small is that that type of activity is normally low in its resource demand. Only occasionally, as in the newly approved Project "M" linear accelerator at Stanford, do expenditures reach the multi-million dollar level. For the most part, this research involves one or a few individuals, the equipment is paper and pencil, or blackboard and chalk, or relatively small laboratories. It is only when use or application is involved that expenditures jump sharply.

Probably most important in establishing the Step I level of activity is the fact that we in the United States are more interested in application or experimentation. A good bit of our basic science has been imported—

TABLE III
RESEARCH AND DEVELOPMENT: STEPS, ACTIVITIES AND PROMISES FOR THE FUTURE

Step	Activity	Promise
I	Basic Research Experimental Research Basic Development Advanced Research	Understanding of universe and organization of knowledge about it to: a. Permit major changes in ways of looking at phenomena and activities; b. Create new devices and methods for accomplishing objectives; and c. Identify phenomena and activities which permit revolutionary changes in existing products, methods and approaches. Its promise is great but not identified to specific purposes and the possibility of fulfillment is <i>highly uncertain</i> .
II	Applied Research Advanced Development Basic Evaluation Basic Testing	Singling out or identifying specific potentials or applications with a view to developing devices or methods for utilizing the new general knowledge obtained in Step I. Application or usefulness is identified but the economy, efficiency and acceptability of the proposals remain uncertain. Promise is for great new things.
III	Product Development Product Testing Product Evaluation Pilot Production	Specific devices or methods appear as likely solutions but must be brought reasonably close to final application to determine effectiveness, economy and acceptability. Do-ability has been established and major advances are promised.
IV	Product Application Application Research Applied Testing Application Evaluation	New uses and applications or modifications of existing uses or applications are sought for existing methods, products or components: may result in substantial benefits to users or producers. Some success is reasonably assured since it is evolutionary rather than revolutionary.

chiefly from Europe—either as principles or as scientists who developed their ideas in this country. The bulge in our scientific discoveries in the last 25 years is probably more the result of European scientists coming to this country to escape Fascism, Communism, and Naziism than any real expansion in our indigenous capability. Einstein, von Neumann, and Teller are a few of the scientists whose U. S. contributions are transplants from Europe. There is no assurance that we have yet developed a needed congenial "climate" for basic research in this country.¹²

Our heritage in this area is not as simple and straightforward as we frequently assume. Dr. Dupree presents it:

"From the beginning of the republic, men had two attitudes toward science. On the one hand, seeing its freedom and the withering of superstition and blind authority under its examination, they concluded that it was out of the same pattern as democracy. On the other hand, observing the inaccessibility of its lore to the untutored masses and the support it traditionally received from aristocratic sources, they feared that inconstant democracy could never have the discrimination to foster science on the same plane with authoritarian states. In the twentieth century, this second mistrustful attitude took two forms. One fear saw dictatorships using science with horribly efficient purpose to destroy a free world that had the research but could not mobilize it. The other saw science itself becoming so powerful and so complex that the people could not understand it and their representative institutions could not control it."¹³

Social attitudes and economic forces in the United States also have had their influence on the size of and growth in our scientific activity.

¹² Warren Weaver, "The Encouragement of Science," *Scientific American*, September 1958, provides one appraisal. That issue is devoted to "innovation in science." It contains nine articles, five of which are by individuals born outside the USA.

¹³ A. Hunter Dupree, *Science in the Federal Government* (Harvard University Press, 1957), p. 379.

Another reason for the low expenditures in Step I is that there is just a small number of people capable of or interested in this kind of activity. Recently, there has been a marked increase in emphasis on education in mathematics, engineering and science, and larger numbers of students are being encouraged to enter and are entering these subjects. Whether the rate of activity at the basic level is directly proportional to the numbers turned out in those fields of education remains to be seen. Great ideas are few and far between. Speeding up the process may or may not be susceptible to "the numbers treatment."

Step II expenditures are three times Step I outlays, according to my guess. The amount is still small for the same reasons that apply to Step I. But it is larger because in general more people are available for and capable of doing this type of work and because more elaborate equipment and methods can be used. More people become available as the nature and kind of guidance and direction is more easily established. Although the equipment in many cases is simple, relative to that involved in subsequent steps, it is likely to be more complex and in larger quantity, hence more costly than that used in Step I. Illustrative of this was the estimate in 1940 that \$100,000 would be required to attempt the first nuclear chain reaction. Very little had been spent in the basic projections. Billions were required for Step III in the development of nuclear fission.

The wide spread of expenditures between Steps II and III in the development of atomic energy is representative of general military situation. In many modern weapon developments, the size of the resource demands in Step III becomes spectacular because of a factor of time concentration. When time pressures are not as great as in many national security problems, expenditures are smaller because product development and build-up is more gradual. In a more leisurely approach, many of the problems in one development are solved as part of other researches.

For many reasons, most research expenditures are devoted to Step IV. First and foremost is the reasonable assurance of success, since the changes sought are small order variations in proven methods, devices, and approaches. Second, because so much is already known about the undertaking, very large numbers of people are available for and interested in this kind of work. Third, in most activities—whether production, management, or marketing involved in equipment, cosmetics or social services—making improvements and changes of this kind is the essence of day-to-day business or professional activity. Since ours is a goods-oriented society as Professor Galbraith explains in *The Affluent Society*,¹⁴ there is a pressure to do this kind of research. Because the payoffs are reasonably assured, it is easy to understand why it should comprise the great bulk of the effort. Perhaps equally important, unless there is a large output in Steps I and II, research and development can only seek the small improvements, which in my concept characterize Step IV.

Conclusion

Our present-day national research and development program is based on the assumption that all research contributes to the nation's general welfare. In this assumption we frequently confuse the object of research—new knowledge—with the form and procedure of the searching activity.

Identification based on current practices makes it difficult to measure research in any meaningful way and makes it virtually impossible to distinguish between the part of it that is a search for startling new knowledge and that part which is new only in the sense that someone else is doing today about the same kind of thing that many others did yesterday or sometime earlier. We regard all research as good and would like to impute to all of it the value it has achieved when identified with the *Great Researchers*—Darwin, Einstein, Newton, Planck, and so on.

This paper has set out four steps as possible points for identifying and classifying research, development, test, and evaluation activities in terms of their content and promises for the future. Since the statistical data that are available are not very useful for measuring the effort devoted to these separate objectives, I have made a personal guess that in 1959 something like \$400 million is what we put into the search for new knowledge in the dramatic and exciting implications of new knowledge. When this is adjusted for price change and cost-inflationary administrative practices, a basic question is raised as to how much more we really are doing now than we were doing ten or twenty years ago.

For the aggregate measurement, we can take or leave the \$10 billion R&D outlay cited for 1959. This view applies also to annual changes in totals over the years. As now compiled, such figures are a dubious measure of national resources allocated to basic improvements to the United States of the year 1980 or 2000. Classification problems, like that occasioned by the Internal Revenue Act of 1954 which allowed business to "expense" research and development expenditures for income tax purposes and the budget change introduced by the Department of Defense for fiscal year 1960, overshadow the validity of specific dollar statements over any period of time.

Probably the most fair appraisal of the present rising trend in R&D expenditure is that it is going up because we think it should be going up. How much of it represents either needed or desired contributions to the Brave New World can only be determined after we establish more satisfactory identification and accounting practices than those now available for measuring our research effort.

In the last half-century there have been four major factors in scientific expansion in the United States: World War I, World War II, the Cold War, and the transplanting of European scientists to this country. Whether

¹⁴ John Kenneth Galbraith, *The Affluent Society* (Boston: Houghton Mifflin, 1958).

or not these provide sufficient bases for our R&D efforts to accomplish what is needed, possible and valuable for our survival and well-being, is not at all clear. By looking only at aggregate dollars, particularly if increases arise from reshuffling accounting classifications, we can dangerously delude ourselves.

If we are to make the most effective allocation of resources to R&D, not only scientists but also business and government administrators must give more attention to the identification and accounting practices to be used as a basis for research, development, test and evaluation decisions. A real research effort and one basic in its approach must be undertaken.

In this article I suggest a classification based upon four steps in research and development, as follows: (1) basic or experimental research and development; (2) ap-

plied research, advanced development, and basic evaluation and testing; (3) product development, testing, evaluation, and pilot-production; and (4) product application research, applied testing, and evaluation.

Those making resource allocations in government and in individual businesses can, with such a classification and a clear understanding of the degree of uncertainty or risk associated with each level of expectation, find a better basis for answering a fundamental problem of today. It is: are we putting enough into research aimed at the long-range future? I speak particularly of research on that which goes beyond what we now visualize as characteristic of the products we can identify as those we will be making and using five to ten years from now. This is a critical question for national survival. It is a critical question for the survival of an individual company.

A Struggle To Reward Good Executives

J. GRANT MACDONNELL

Probably no one plan to reward the executive will fit all possible conditions. So incentive awards should be tailored to suit the individual and the company.

Because current high tax rates scoop the cream off executive salaries, business today is faced with the problem of finding new ways to offer incentives that will attract or retain competent management. Too often, mere salary increases are meaningless to executives in the higher tax brackets. These executives may retain only 20 to 30 cents (or even less) of each dollar of their increase. And it is no secret that many companies look with some disfavor on the fact that the greater portion of an executive salary increase finds its way into the coffers of the United States Treasury when the company could have retained the money at a maximum corporate tax rate of 52 percent.

Business is caught in a dilemma; competition for key executive personnel forces it to offer incentives, yet the better part of any monetary incentives are gobbled up in taxes. The solution? Several plans geared to meet this problem are being tried by various companies. It is the purpose of this paper to report and evaluate the most widely used of these plans.

First, I would like to clarify the legal and economic problems involved in devising an adequate plan to reward valuable executive personnel. Perhaps the biggest single obstacle in the path of all executive compensation plans lies in the theory of "constructive receipt," or "present economic benefits," as laid down and interpreted by the Internal Revenue Service. The I.R.S. takes the position that at any time money is available to a taxpayer—at his option—a current tax liability accrues to him. It is not enough that he

chooses not to take advantage of the cash, or that he decides to leave the coupon unclipped in the safe deposit box. If the taxpayer has a present and irrevocable right to the value, he must report the amount as income (even though at a commuted value if there are restrictions as to time).

Balanced neatly on the horns of this dilemma is the fact that the company must choose a program fitted to the needs and requirements of several different individuals without sacrificing its own cost advantages. Probably no one plan will fit all the possible conditions to be encountered; incentive awards should be tailored carefully to suit the individual executive. A junior executive with high potential will prefer current salary and benefits; a senior executive probably will wish deferred compensation to minimize current tax and to increase retirement income.

Business, then, must reward the individual manager in a way that will ensure his willingness to remain with the firm; offer incentives that will attract seasoned executives from competitive enterprise to fill voids in the managerial staff; and create an incentive environment for the younger executive that will sustain his interest toward the day he may succeed to a higher position. And in the tax climate of today where creating an estate through ordinary income alone is an almost insuperable task, the senior manager thinks more and more of retirement income, family protection, loss of income in the event of early death, and security in its financial sense. These requirements have given rise to a series of plans for compensation includ-

TABLE I
ADVANTAGES OF VARIOUS EXECUTIVE COMPENSATION PLANS

Plan	Incentive Value	Current Cash Retention	Current Cost Deduction	No Stock Dilution	Capital Gain vs. Income Tax	Inflation Hedge	Retirement Income	Family Protection
Bonus—Profit-Sharing	×	..	×	×
Deferred Pay Plans	×	×	..	×	Maybe	Maybe
Pension and Retirement Plans	×	..	×	×	×	Maybe
Stock Bonus	×	×	×	..	Later	×	..	..
Restricted Stock Options	×	×	×	×
Non-restricted Stock Options	×	×	×	..	Later	×	..	..
Employment Contracts	×	×	..	×	Maybe	Maybe
Split-Dollar Life Insurance	×	×	..	×	×
Investment Trust	×	×	×	×	..	×

TABLE II
DISADVANTAGES OF VARIOUS EXECUTIVE COMPENSATION PLANS

Plan	No Current Reward	Cash Outlay	Stock Dilution	No Retirement Value	Inadequate Values	No Cost Deduction	No Inflation Hedge	Possible Forfeiture
Bonus—Profit-Sharing	..	×	..	×	×	..
Deferred Pay Plans	×	Maybe	×	×	×	×
Pension and Retirement Funds	×	×	×	..	×	..
Stock Bonus	..	×	×	×	..	×
Restricted Stock Options	×	×	..	×
Non-restricted Stock Options	..	Taxable Income to Holder	×	..	..	..	..	×
Employment Contracts	×	Maybe	..	Until Paid	×	×
Split-dollar Life Insurance	..	×	×	..	×
Investment Trust	..	×	×	..	×

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ing—in addition to plain salary increases—bonus and profit-sharing plans, stock options, stock-bonus plans, deferred pay contracts, annuity plans, insurance programs, deferred compensation plans—and combinations of these.

In order to depict the several more common methods of establishing executive compensation plans, an attempt will be made to describe these in sufficient detail to enable the reader to visualize the general terms and conditions. Tables I and II show specific advantages and disadvantages. For simplicity's sake, both corporate and personal values are represented in each chart and can be easily segregated where applicability is only to one or the other; in many cases the values pertain to both parties.

Bonus or Profit Sharing

The earliest and still one of the most prevalent compensation practices among businesses was to establish a bonus system, the company electing to reward key executives for outstanding performance by a distribution of cash from the profits of the enterprise. The disadvantage inherent in this plan lies in the fact that, as such rewards normally are larger for those men with higher salary levels, the after-tax residual decreases as the salary increases. An argument is made that bonus distribution would be more beneficially apportioned if it were made on a broader base of personnel. While this is partly true in theory, it begs the present question of a suitable reward or incentive for the senior executive.

The corporation profits most from the bonus plan inasmuch as the full costs thereof are deductible as a current expense; and while this plan does provide some features of incentive—particularly in the lower salary brackets—the incentive diminishes rapidly as tax brackets mount. Stockholders look upon a properly regulated profit-sharing plan as justifiable in that rewards usually are tied to net income, and as the net increases, so may dividends. The fallacy from the executive's

viewpoint is that even if he exerts extraordinary effort, profits may not materialize and his reward, therefore might vanish.

Since this form of compensation leaves much to be desired, many companies have undertaken other ways of establishing incentives. Consequently an effort has been made to devise methods of setting aside the bonus funds to be paid out at a later date.

Deferred Pay Plans

In considering ways by which dollars can be set aside for future payment to executives, a new type of problem has arisen. "Constructive receipt" of the cash must be avoided or the executive could find himself in the unhappy position of paying a tax on money not received. A common practice has been to establish an irrevocable trust into which the company places the dollars available, stipulating the personnel who are to receive it in proportional shares. Agreements are entered into by which the money deposited will be paid over to the stipulated personnel upon expiration of term certain if the conditions set forth in the agreement are adhered to.

The conditions referred to are restrictions that must be present in the agreement to avoid the recipient's being subject to the "present economic benefit" theory. These conditions consist of such normal requirements as agreement to be available for consultation at the reasonable call of the company; to refrain from engaging in competitive enterprise; to forego investment in any business of a competitive nature to such an extent as might be tantamount to control; and such other terms as may be agreed upon. The intent of these conditions is, of course, to provide forfeiture clauses that might liquidate the company obligation to the executive, both to protect the company's interests and to establish obligations on the executive that would bind him to the best interests of the company and suitably reward him for performance.

While these programs have shown valuable gains for the employee insofar as current

tax liability is concerned, there are serious considerations to be evaluated by the company. Substantial cash reserves have to be set aside in the irrevocable trust which, because of reversionary possibilities emanating through default, cannot be taken as current deduction. On the other hand, if the company should attempt to conserve cash by not funding the trust until cash requirements exist, the executive is faced with a gamble on corporate solvency at the time of reward. In addition, this plan leaves unsettled the matter of immediate reward and hangs the Damoclean sword of forfeiture over the executive for failure to adhere to the restrictive clauses.

Pension and Retirement Plans

These programs serve best the rank and file employee for whom such benefits, taken in conjunction with Social Security, provide some measure of retirement security. Since, however, these plans usually have provisions whereby benefits lapse in the event of early voluntary termination or, indeed, may not vest until the employee reaches a specified age; and since the plan must not be prejudiced in favor of the highly paid employees, there still remains the question of current incentive. Standard pension plans are usually "qualified" as to format by the Treasury Department. Unless the plan has received qualification; current funding cost may not be taken as a deduction for tax purposes. Any plan that is restricted to a few or highly selective group of executives is most likely to be refused this qualification. Also, pension plans must be integrated with Social Security and have the intent of permanency.

The general lack of executive-incentive value in most of the foregoing plans have led many companies to seek out more sophisticated ways of accomplishing the goal: the granting of reasonably current rewards or incentives which would not incur severe current tax impositions.

Stock Bonus and Stock Options

In an attempt to avoid current tax lia-

bility, Stock Bonus or Stock Option plans have become increasingly popular. Stock Bonus awards, to be sure, are considered the equivalent of a cash distribution and are taxed currently at the fair market value as of the date of grant. However, the advantage lies in the fact that, unlike cash, stocks have an increased value potential, the amount of which will be taxes at capital gain rates upon realization. Not the least of the incentive features of the Stock Bonus plan derives from the fact that some part of the potential increase in value may be the direct result of the recipient's own increased effort. The obvious hazard in a Stock Bonus plan lies in the fact that market values may diminish.

Restricted Stock Options, in contradistinction to Bonus Awards, are not considered to be current income under specified conditions. Under these plans, the company grants an executive rights to acquire shares in the enterprise at a price and at such times as are stipulated in the agreement. Under current I. R. S. rulings, no tax is imposed if the option price is at least 95 percent of market value. In that case, no deduction of costs is permitted the company. When the executive disposes of his stock, the gain in value from option price will be taxed at capital gain rates. If the option is awarded at a price of between 85 percent (the lowest exercise price permitted by the I. R. S. code to qualify as a restricted, or authorized, plan) and 95 percent of market value, special tax treatment is accorded. Taxable income will accrue to the grantee on the difference between option price and market value either at the time of option or of sale, whichever is lower. Should death of the recipient intervene, date of death will supplant sale date.

Restricted Stock Options, with the tax treatment noted above, are sometimes considered too conservative. Many companies choose to utilize an unrestricted (and non tax-exempt) plan permitting executives to acquire stock at a price substantially below the 85 percent of market value and without the usual restrictions found in the authorized

plans. Thus, the grantee can buy stock at a nominal cost and have an excellent chance of realizing a substantial increase in value at the time of sale. The penalty involved, however, is that the Treasury considers the difference between the fair market value at the time of award and the cost at time of exercise to be taxable income to option holder: any increase in value from then on until point of sale of the stock is considered to be capital gain. Unlike the restricted stock plans, this plan allows the company to take as current deduction the cost value of the bargain granted the employee, if the bargain is within the bounds of reasonable compensation.

A serious objection to unrestricted stock options arises from shareholder sources. Many complain that the practice tends to dilute the stock value in that such shares are usually issued from the corporate Treasury stock and proportional value is not paid in by virtue of the below-market cost. Some companies have attempted to correct this problem by purchasing the necessary optionable shares on the open market and delivering to the optionee at the agreed price. While, compared with issuance of Treasury stock, this practice avoids dilution of equity values, it results in a loss of cash for the company which, while deductible for tax purposes, is less easily managed than a bookkeeping loss that is likewise deductible.

The heavy emphasis on stock plans of whatever nature in recent years, however, is testimony to the fact that corporate management has become increasingly aware of the effects of inflation—both on fixed pension plans and on deferred compensation. The 1958 recession did little to slow the continuing trend toward dollar devaluation, and it has been apparent that incentives combining future values with some degree of flexibility in purchasing power will prove far more effective.

In general, stock option plans result in low or no-cost solutions for the corporation and a potential gain for the executive at a

known and reasonable cost. They tend to tie him to the company apron strings during the option period and encourage increased efforts on his part to enhance the net profits of the company. They impose no tax liability on the executive at the time of award and permit the company to retain the cash for current business. They vitiate corporate equity to the least degree and serve to secure for the company at low cost the best potential management.

Most of the methods noted above are either aimed at a significant number of employees or at a high percentage of the senior executives and do not, therefore, satisfy the peculiar requirements of a single senior executive who must be retained at almost any cost to provide continued leadership; a man who by virtue of his established worth is subject to continuous proselyting by a competitor. As there will seldom be more than one such individual in a corporation, and as it is probable that the normal inducements may prove inadequate to hold him against the blandishments in cash and prestige he may be proffered elsewhere, some more singular approach is indicated.

The day when loyalty to employer could be counted upon to retain executive services through thick and thin is fast disappearing under the pressure of circumstance. In these times when more and more attention is paid to professional management and when taxes remove so much incentive from high salaries, corporate directors are finding that the supply of such men is scarce and the demand increasing. An example should suffice to illustrate how comparatively inadequate standard pension plans may be for a senior executive.

A man (under one standard pension plan) who retires after twenty-five years with a monthly salary of \$710 will receive—including Social Security benefits—about \$220 per month, or 31 percent of his final rate. An executive who retires after twenty-five years with a salary of \$2150 per month will receive a pension income of about \$550 per month,

or 25 percent of his final rate. With the normal financial demands on a senior executive, including a living scale required in part by his position, it is more difficult for him to retrench to the retirement figure than it should be for the first pensioner.

To equal his final pay rate, an executive would have had to supplement his retirement pension income with the proceeds of a personally amassed fortune of nearly \$400,000, yielding 5 percent. Thus, any company which can show a prospective senior man some hope of obtaining a more comparable value for the retirement years will have tremendous appeal. To afford some relief from this problem, many companies are turning to employment contracts.

Employment Contracts

Under these contracts, a mutual agreement is reached as to length of employment—usually until retirement age. The executive agrees to make his services available to the company after retirement for specified periods or percentages of time during the ensuing years. In the post-employment period, he will consult with, advise, and in such other ways (including reasonable travel) assist the company in the conduct of its business. Further, he contracts that at no time will he engage in any activity of a nature competitive or conflicting with his own company; that he will not invest in a competing industry to such an extent that the investment would constitute substantive control; that he will in no way assign or encumber his interest in his retirement pay; and such other restrictions as the company may feel obliged to impose.

For all of this the executive will receive a guaranteed salary during the remaining period of employment and a fixed annual rate of income for a specified period of time during his retirement. He obtains a "promise to pay," contingent upon certain conditions, that provides both a higher retirement income value than the normal pension plan and a family protection plan—dependent

upon the retirement terms—which offers considerable incentive. The executive also obtains tax advantages in that by taking retirement income in lieu of current cash bonus or salary increase, he receives a comparable amount over a period of lower total income, resulting in lower tax rates.

The company, under such plans, also receives certain benefits. While it cannot take a current deduction for the contingent payment to be made in the future, it does retain the cash for current operations. It does have an allowable expense at the time of actual payment. It is the practice in many corporations to secure life insurance on the executive—payable to itself—thereby minimizing the cash outlay required. The executive is, of course, not liable for tax since he receives no income from the premiums or policy.

One of the most important aspects of these arrangements becomes significant in the event the company should choose to fund the agreement with the executive. In these circumstances, the I. R. S. will check carefully to determine that no "constructive receipt" is involved, for if so, a current tax would be imposed on the value. Thus, it is imperative that such conditions of forfeiture are included that failure to perform would void the contract and thus ensure that no vesting of interest can occur prior to the agreed payment dates.

Special life insurance programs are often arranged for the senior executive in addition to these contract agreements to provide protection for families in the event of premature death prior to pay-out under the contracts. These policies are so varied, and the tax problems—including estate tax liability—so acute, that specialists should be consulted to work out the particulars.

Life Insurance

While many companies have provided standard life-insurance coverage for their employees on what amounts to term rates, these programs do little for the incentive problem. The coverage for protection pur-

poses is normally small, and the policy or coverage will lapse in the event of termination of employment.

Recognizing that special inducements are needed for promising younger executives, not all of whom can be compensated in any significant manner, many organizations are embarking on an unusual insurance program wherein the premiums are split between the insured and the company. Under this plan, the company authorizes the employee to secure a straight life policy for a specified amount for which the employee pays the first year's premium. Starting with the second year, the company agrees to pay such portion of the annual premium as is represented by the cash surrender value of the policy. Inasmuch as the cash surrender value increases each year, the portion paid by the company increases each year and the employee share decreases. At all times after the first year, the cash value of the policy belongs to the company and the residual to the insured. Depending upon age, the average employee would pay reducing annual premiums for seven or eight years, after which the company would pay the entire premium.

The advantages and incentive in this program are obvious. During the early—and younger years—the employee has a high residual value in the authorized policy and, thus, good family protection. Later, when his earnings are higher and other incentive programs may become operative, his residual values are reduced but other benefits have been accrued. For example, under a normal pension plan the values are low at the inception, while after eight to ten years the retirement values will have increased materially. Thus, the family protection incentive is great in that values are greatest at times of greatest need.

Taxwise, the contributions made by the employer under "split-dollar" insurance are not deductible, but the receipt of the cash value is not taxable income. Under current rulings, the employee is not taxed on employer contributions to the premium, nor is

the death benefit considered as taxable income to the beneficiary. The question of how to treat this arrangement in the event of employee termination normally differs from conventional insurance coverage. In split-dollar insurance plans, rights accrue to both employee and employer. The most practical solution would seem to be to give the insured re-purchase rights to his policy by which he may elect to reimburse the company for its share of premiums paid and secure to himself full beneficial rights. Since the cost would be predicated on cash surrender value at all times, the value, of itself, will constitute a borrowing base for the employee to finance such a re-purchase agreement.

Insurance plans are many and varied. They can be used to fund agreements and to provide cash for reimbursing company commitments to executives, and they are available for providing family protection beyond the life of the executive. With reasonable care and planning, insurance provides one of the cheaper methods of providing cash to cover other forms of incentive compensation. Where retirement contracts are written to include a term certain not terminable by the death of the covered executive, insurance will cover the unpaid portion of the contract if the executive dies prior to fulfillment of the term certain.

Investment Trust Program

The fact that inflation has been progressing at an annual average rate of 2½ to 3 percent makes both standard pension plans and employment contracts (indeed, any fixed-value programs) as uninviting as fixed annuities. The value of the dollars received under any form of deferred payment would purchase far less than at present. This fact tends to diminish the lure of deferred-pay contracts and other fixed-value inducements in the minds of many executives.

As an alternative, some companies have established a selective investment trust fund with redeemable common shares. This fund—specifically designed to fit the needs

of corporations in these matters—comprises principally common stock. All income from trust investment portfolio as well as any corpus increase is accumulated and reinvested in the fund. No dividends are paid, and the only charge against the fund is the administrative costs of operation.

A corporation may purchase shares in the trust and simultaneously grant options for these shares to key executives at any time. The options may be exercised by the grantee at company cost under such terms concerning time or amount as the company may choose. These option terms may vary from individual to individual as best suits the circumstances, and the company may establish such restrictive clauses or forfeiture conditions as will best protect the company objectives. The only obligation on the part of the company would seem to be to hold the shares purchased until the option periods have expired or rights exercised. At such time as the executive avails himself of the options, he refunds to the company its cost and is then free to hold, sell, or redeem the shares.

Whether the disposition of these shares following option would constitute taxable income or be considered as capital gain is uncertain. This program has not as yet been tested in the tax courts. Opinion would indicate that if the plan were under comparable conditions and restrictions such as found in standard stock-option plans, capital gain should result on the difference between acquisition at company cost and value at time of disposition. Inasmuch as no income or capital increase is distributed from the investment trust, there is a compounding effect on the per-share values. For example, if the combined rate of increase in fund value is $6\frac{1}{2}$ percent per annum through both appreciation and income, a \$1000 investment would be worth approximately \$4800 in 25 years.

It is reasonably likely that no tax would apply until actual sale of shares by the executive, who thus controls the time to that most advantageous to himself. The possibility also

exists, however, that as in the case of unrestricted stock options, the I. R. S. may consider the difference in value between company acquisition and option award and the value at time of exercise to be taxable income to the option holder.

The investment trust program offers advantages both to the company and to the executive. While the company would have to set aside the cash represented by its investment in the shares of the fund from which no income is derived, the value of the purchase would remain as an asset on its books until such time as the options were exercised. At this point, the asset becomes liquid again. In the interim, it has had little or no cost of administration; there has been no dilution of its equity as there often is in the case of stock options; and it has retained the right to modify its awards at its sole discretion.

The executive may exercise his option at any reasonable time, although for the first few years there is little advantage in doing so. But that very fact tends to retain his interest until the acquisition becomes more valuable. For example, at the end of 10 years (under the assumptions expressed above) a \$1000 option would have an accrued value of about \$1900. For the better part of this period, the executive would pay out the greater portion of the value in order to exercise his option; however, from this point on the accrued value would be attractive and would constitute a borrowing base to make option exercise more attractive.

Conclusion

The foregoing will serve only to illustrate some of the more common forms of executive compensation. It cannot be presumed that any one approach is "best" for any organization. Indeed, the evidence should be ample to indicate that almost every individual situation requires a particular solution patterned to the needs of both the company and the executive. There are some indications that industry is going too far in its zeal to accomplish special compensatory agree-

ments with its top executives, and a re-evaluation of the real necessity for entering into such programs. Most important to remember is that many such plans extend far into the future and may involve commitments from

both company and employee that could prove cumbersome. For this reason, expert counsel should be employed to deal with these matters.

The only executives I know personally who have so cleared their desks and arranged their schedule that they have no details to worry about and can devote all their time to long-range planning have long lost their ability either to administer or to think.

Gen. Lucius D. Clay

Stock Market Warning: Danger Ahead!*

BENJAMIN GRAHAM

Good business mixed with steady inflation has produced a powerful stock-market cocktail which the public is finding intoxicating and most agreeable. Will a hangover follow soon?

The stock market has been advancing with only one significant setback throughout the decade of the 1950's. It has thus established a new record for the length of its rise, although it has not equaled the extent of the record advance of the 1920's: 325 percent in this market versus 450 percent from 1921-1929.

What does this phenomenal upward movement portend for investors and speculators in the future? There are various ways of approaching this question. To answer it, I shall divide the question into two parts. First, what indications are given us by past experience? Second, how relevant is past experience to the present situation and prospects?

As to the first part of my answer, I should be able to make some definite statements—which will be the reverse of encouraging. But as to the applicability of the record of the past to the present, I cannot express a categorical judgment. I shall present certain facts on the one side and certain expectations pointing the other way; I shall state my own opinion as to the probable answer; but in the end, each must resolve that part of the question for himself.

Indications from Past Experience

However, in order to judge today's market level, it is desirable—perhaps essential—to have a clear picture of its past behavior. Speculators often prosper through ignorance; it is a cliché that in a roaring bull market knowledge is superfluous and experience a

handicap. But the typical experience of the speculator is one of temporary profit and ultimate loss. If experience cannot help today's investor, then we must be logical and conclude that there is no such thing as investment in common stocks and that everyone interested in them should confess himself a speculator. This is just about what has actually happened in recent years—only in reverse. Everyone now calls himself an investor, including a huge horde of speculators.

This point is neatly illustrated by the opening lines of an article in a recent issue of *Business Week* describing the annual convention of Investment Clubs. The writer says: "Like all investors, large and small, they were mainly interested in which way the market—and particular stocks—would move next." If that sentence accurately describes a *bonafide* investor of 1960, then—to use a phrase made famous by a certain Mr. Krushchev—the shrimps have really begun to whistle on the mountaintops.

Bull Market or New Market?

The main issue before the investor may be expressed this way: Have we been in a bull market or in a new sort of market? If this is a bull market, then the term itself implies a bear market to follow it some day. What could be the probable extent of a decline in a traditional bear market? Here are some figures, which apply the experience of the 12 bear markets since 1874 to the recent high level of 685 for the Dow-Jones Industrial Average.

* This article is based on a talk delivered at the University of California, Los Angeles, on Dec. 17, 1959.

TABLE I
COMPARISON OF TWELVE BEAR-
MARKET DECLINES

TIME PERIOD	PERCENT DECLINE	EQUIVALENT LOW FROM 685
1874-77	36	435
1881-84	26	500
1889-97	40	410
1901-03	44	385
1906-07	45	375
1909-14	29	485
1916-17	36	435
1919-21	44	385
1929-32	85	115
1937-38	44	385
1939-42	39	415
1946-49	27	490

The average of these 12 declines (all taken from Cowles-Standard indexes) would indicate a market low of about 400, a fall of over 40 percent from the 685 high. Investors may consider themselves mentally prepared for a 40 percent shrinkage in stock prices, especially if they envisage such a drop as taking place from a level far above today's average. At this point, however, a second factor from past experience becomes relevant. The record shows that declines have tended to be roughly proportional to the previous advanced. Thus, the 6 largest advances averaging 63 percent of the high level reached were followed by declines averaging 46 percent while the other 6 advances averaging 38 percent of the high produced declines averaging 37 percent.

Experience gives us another measure of the possible bear-market decline. This measure is based on the principle that the higher the market advances above a computed normal, the further it is likely to decline below such normal. If this principle—enunciated long ago by Roger Babson—were to hold in the future as in the past, then a further rise of the market from these levels—in itself an alluring probability—would actually carry with it an intensified future penalty.

Let me illustrate this point of experience

by some horrifying assumptions—to present the worst of the picture. Let us assume that the market makes everyone happy by advancing fairly soon to that millennial level of 1,000 for the Dow-Jones Industrials, of which some predictions are already on file. Assume further that this is a speculative advance—very like that of the late 1920's—and that the Central Value of the D-J Average at the time is only 400. By applying the old Babson economic law of “action and reaction—equal and opposite,” the corrective downswing would carry the average as low as 160, a loss of 84 percent. Impossible, you say, and no doubt you are right. But a condition similar to the one I am assuming actually occurred in 1929, and the ensuing shrinkage in the D-J Average was not 86 percent but 89 percent—from 382 to 42.

There is a paradox in this economic law which makes it virtually impossible for it to find acceptance in practice. For the almost universal optimism that accompanies the great advances in the stock market precludes even the most conservative observer from imagining a decline so drastic as these figures illustrate.

Current Optimism

Let me turn now from this Cassandra-like utterance to the picture of the future stock market that is strongly etched in the minds of most investors and speculators and of their expert advisors. Past experience may not be entirely eliminated from this picture, but it enters in a very muted way. The keynote, of course, is optimism. We are enthusiastic about business prospects for the next decade. In fact, that period received its name in many quarters—the Fabulous Sixties—even before it had begun. Herodotus recounts a saying of Solon the Wise that rich King Croesus sadly recalled before his execution—namely that no man's life should be accounted a happy one until it is over. Perhaps the more prudent time to characterize the 1960's would be when they are over rather than when they have just begun.

Most people are equally optimistic about the stock market. One of my friends—a brilliant analyst—was quoted recently in the Wall Street Journal as saying that the bull market is about to enter its 19th year and soon will be able to vote. Translated, that means he is carrying the bull market both backward in time to include 1942—ignoring the 1946-49 setback and doldrums—and confidently forward in time to 1963.

The optimism about both business and the stock market is founded on a host of favorable facts and expectations, including as an important "favorable factor" the likelihood of continued price inflation. I shall discuss these a little later.

Investors accept in theory the premise that the stock market may have its recessions in the future. But these drops are envisaged in terms of the experience of the past 10 years when the maximum decline was only 19 percent—from 521 to 420 in 1957. The public is confident that such setbacks will be made up speedily, and hence that a small amount of patience and courage will bring great rewards in the form of a much higher price level soon thereafter.

Investors may think they are basing this view of the future on past experience, but in this they are surely mistaken. The experience of the 1949-59 market—or of all bull markets put together—reflects only the sunny side of investment. It is one thing to say airily that the market has always come back after

declines and made new highs; it is another to reflect on the fact that it took 25 years for the market to reach again the high level of 1929, or that the D-J Average sold at the same high point in 1919 as it did in 1942—23 years later.

The Present Bull Market In Relation to Past Ones

Up to now I have been talking only in terms of past fluctuations on the one hand, and present confidence and optimism on the other. It is time to fill in the picture with certain financial and economic data which will place the present stock market quantitatively in relation to past bull markets.

We have a number of authoritative measures of the factors of earnings, dividends, and asset values in relations to price, as applied to the market as a whole—with most emphasis placed on the industrial list. My data will apply to the industrials only. There are the figures for the 30 D-J issues published by Barrons; on 125 issues of Moody's; and the very comprehensive group of 425 industrials of Standard-Poors. Rather strangely, all three indexes give very much the same indications, both currently and over the last thirty years. At the high levels of 1959, the dividend yield on all three indices was just about 3 percent, and the ratio of price to earnings of the past 12 months was about 19 times. Let us compare these ratios with some figures for the high levels of past bull markets:

TABLE II

	Moody's 125 Industrials		Long-Term Bond Yield (Moody's AAA Corporates)	Standard-Poors 425 Industrials	
	Price-Earnings Ratio	Dividend Yield		Price-Earnings Ratio	Dividend Yield
1959 High.....	19.0x	3.06%	4.55%	18.2x	2.95%
1949 Low.....	(Av) 7.1	(Av) 6.82	2.65	5.6	7.50
1946 High.....	15.9	3.58	2.49	16.1	3.55
1937 High.....	17.3	4.15	2.27	17.6	4.08
1929 High.....	19.4	3.23	4.95	19.0	3.10

And now compare them with the situation just before this bull market started in 1949:

TABLE III

	Dow-Jones 30 Industrials			Standard-Poors 425 Industrials		
	Earnings	Dividends	Price	Earnings	Dividends	Price
Cal. Year 1949.....	23.54	12.79	Low 161	2.46	1.03	13.9
12 mos. Sept. 1959..	35.14	20.00	High 678	3.50	1.92	65.3
Percent Increase....	49	57	322	42	86	370

These figures illustrate two important points. The first is that the ratios of price to dividends and to earnings are just about where they were at the top of the markets in 1946, 1937, 1929, and about 2½ times what these ratios were ten years ago. The second point is that the actual increase in earnings between 1949 and 1959 was very modest—only about 50 percent or less. During this period, the interest rate on highest-grade bonds advanced from 2.65 percent to 4.55 percent, or about 75 percent. This means that if the proper rate of capitalization of current earnings should vary with long-term interest rates—a not implausible theory—then common stocks would actually be worth less now than in 1949, although they are selling 4 times as high.

The value situation is not as bad as that, however. On the one hand, we find that dividends have increased more than earnings, and have nearly doubled in the ten years—at least for the Moody's and Standard indexes. Again, if we capitalize average earnings, say of the past ten years, rather than the last 12 months' earnings, we would find an increase of about 120 percent between the 1940-49 and 1950-59 decades. What is most important, perhaps, is that the 1947-49 price level was clearly too low. But even making allowance for these three factors, the actual figures would probably not produce an increase of more than 100 percent in value from the 1949 year-end figure of 200 for the D-J index.

If the rise of interest rates is not taken into account—and most of the valuation methods

applied to the D-J index do not do so—the various techniques will produce, for the most part, higher figures. These figures cover a wide range, but they all have one thing in common: they are appreciably lower than the present market price. Let me summarize a few of the valuations referred to in the 1959 edition of "The Intelligent Investor," which apply to the beginning of that year: Gerstein—383; Molodovsky—560; Value Line—471; Weston—600; Graham—365. Not all these methods have been applied consistently in the past—the high ones are definitely influenced by the new and more favorable attitude towards common stocks. I would estimate that the older valuation methods—i.e. those in use prior to 1955, let us say—would yield a current average figure of no more than 450, or one-third less than the present level.

Two of the large financial-counsel firms have made valuations applicable to the year 1963—four years ahead of their valuation date. One found a value for the D-J of 664, the other of 634. These were based on rather optimistic assumptions of earnings growth in the next four years. If we assume that their conclusions are sound, we then should have to observe that the stock market is already paying a full price for the much better earnings and dividends expected in 1963. (Note that these 1963 valuations cannot properly be said to derive from past experience, in the manner of the other figures presented.)

This ends my presentation of the direct implications of past experience as applied to the current market level. My conclusions are

not favorable. They would imply that the current bull market is repeating the excesses of past bull markets and is destined to pay a penalty correspondingly severe. But now I must approach the second part of my review, and raise the companion question: "How relevant and useful is past experience as applied to the present situation?"

New Economic Factors

Most investors, businessmen, and economists are convinced that the business world we find ourselves in now is radically different and more favorable than that of the past. The improvement is of two kinds: First, the positive drive towards an expanding economy. This is powered by rising population, more research, more sustained capital investment, broader consumer spending, etc.—in other words, by a confident and aggressive attitude in all the important sectors of the economy. Then we have new defenses against recession, which will guarantee us more stability than in the past. These include the Government's obligation to maintain high-level employment, assumed in the 1946 Act, and the automatic built-in stabilizers, such as unemployment benefits, social security, farm supports. Two other factors—not as respectable as those just described—are also counted on by many to help maintain and expand the economy. One is price inflation, considered as beneficial to business if not overdone. The other is the Cold War, with the huge defense spending that it entails.

This array of favorable factors is most imposing, and it has captured the imagination of many, perhaps most, experienced economists. The case for very good business in the 1960's is made energetically in a current book *New Forces in American Business* by Dexter Keezer and the McGraw-Hill economics staff.

The optimism about business is no doubt the chief factor in producing the present optimism about the stock market. But here the factor of inflation plays a stronger and almost separate role. People tell themselves,

on the one hand, that the inescapable inflation of the future guarantees ever-higher earnings and prices for common stocks—and, conversely, that if their funds are held in bonds or other cash equivalents their real value, in terms of purchasing power, will dwindle constantly. This combination of prospects for the 1960's—good business mixed with steady inflation—has produced a powerful stock-market cocktail which the public—young and old, experienced and inexperienced—is finding intoxicating and most agreeable.

The Rosy View of the Future

Now what can past experience tell us about the validity and dependability of this rosy view as to the future of business and common stocks? Its verdict cannot be conclusive, because no prediction—whether of a repetition of past patterns or of a complete break with past patterns—can be proved in advance to be right. Nevertheless, past experience does have some things to say that are at least relevant to our problem. The first is that optimism and confidence have always accompanied bull markets; they have grown as the bull markets advanced, and they had to grow, otherwise the bull markets could not have continued to their dizzy levels—and they have been replaced by distrust and pessimism when the bull markets of the past collapsed.

As might be expected, the previous period of greatest enthusiasm about the economic prospects of the U. S. coincided with the tumultuous bull market of the late 1920's. Then, as now, nearly everyone was convinced that we had entered a "New Era" of continued and dynamic prosperity which made all past market experience worse than useless. You all know that the phrase "New Era" became almost the official description of the American economy of 1928-29. It is a bit ironical to note that today nearly everyone is again convinced that we have entered into a new era of sustained and dynamic prosperity, but also that everyone is care-

ful not to use the convenient words "New Era," because they would remind us too uncomfortably of what happened in and after 1929.

In the 1920's, also, the new idea that good common stocks are intrinsically sounder than bonds gained ground rapidly. The financial services explained away the apparent dangers of stock yields below bond yields on the ground that the growth factor would eventually more than repay the stock buyer for his present sacrifice of income return.

Influence of Price Inflation

The factor of price inflation did not enter into the market of the 1920's, since the price level remained steady throughout. However, it did enter into the thinking of investors and speculators in 1936-37; for between the June 1932 low and the March 1937 high, wholesale prices advanced about 90 percent. (This may be compared with an advance of just 19 percent between the 1949 low and the recent 1959 high). You may be interested to know that between 1901 and 1910, wholesale prices advanced steadily to a total of 27½ percent—quite a bit more than in the 1950's. Nevertheless, in that decade, the market experienced two declines of about 50 percent each, and the rise to March 1937 was also followed by a decline of nearly 50 percent.

Past experience shows us two things about commodity-price inflation as a stock market factor. First, inflation has existed most of the time in this century, and often at a much greater average rate than we have seen since 1949. But this has not prevented the stock market from falling disconcertingly after large advances. Secondly, the investor-speculator view as to the significance of inflation has varied greatly in this period. Paradoxically, three of the six *bear* markets since 1914 have been accompanied by *rising* wholesale prices—two of them very substantial. Arnold Bernhard in his recent book, *The Evaluation of Common Stocks*, points out that in the bear-market lows of 1949, many financial

experts were writing about inflation as an unfavorable factor for common stocks—this at a time when the price level had advanced nearly 40 percent in the three years 1946-49.

The past record shows clearly that inflation has been chiefly a *subjective* stockmarket factor. It has exerted an important bullish influence only when wholesale prices and the stock market happened to be rising at the same time. Investors seem to forget about inflation when stocks turn definitely downward.

An arithmetical aspect of the inflation element was brought to my attention recently by William Miller, Executive Secretary of Town Hall. At current levels, tax-exempt bonds returned fully twice as much to most investors as representative common stocks, after allowing for income tax on the latter. The investor in tax-free bonds could accordingly set aside about 2 percent per annum out of his bond interest as a fund to take care of future inflation, and still remain in as good a net-disposable-income position as he would with common stocks today.

There are some factors in our present economy which were not duplicated in previous bull markets. Most of you will think of the great advance in the popularity of common stocks—especially with pension funds and other institutional holders—as one of these new factors. There could be some doubt on this point; for the popularity of common stocks in 1929 may have been not very different from that of today. The New York Stock Exchange points to the approximate doubling of the number of shareholders—from 6 to 12 million—as an indication of the greatly improved standing of common stocks; this, too, is a phenomenon characteristic of a long bull market. No doubt the number of holders had scored a similar advance in the bull market running from 1921 to 1929. In fact, *simon-pure* experience suggests that the increase of small shareholders may be more of a danger than a strength for future stock markets.

Increased Stability

The factors I would recognize as new relate mainly to economic stability—as exemplified by the Government's commitment under the Employment Act of 1946, the institution of unemployment insurance, old-age pensions, and the like. There are few predictions I am willing to make—but one is that the intensity of future business recessions or depressions will be less than it has been in the past. And this is an important bullish factor. Another new factor in today's balance sheet is the Cold War—a really unparalleled phenomenon in former times. My view—not held by many authorities—is that the Cold War has contributed a good deal on balance to stimulating our economy during the 1950's. To what extent it will continue in the 1960's is a matter of opinion; it is also a matter of opinion as to whether or not the related military expenditures will carry the same weight in the total economy as in the last decade.

Possibilities of Decline

If the last two factors I have mentioned are both new and favorable to the business climate, it is proper to ask whether they also guarantee investors a favorable stock market experience indefinitely in the future—more specifically, whether they guarantee him against those market declines on the order of 40 percent or more which we have had so often in the past. To answer this question even tentatively requires me to depart to some extent from consideration of past experience and to indulge in some more abstract reasoning. If business is to have more stability in the future than before 1950—as seems likely—then common stock earning and dividends should also be more stable. This, in turn, should entitle them to be valued more liberally than in the past, which means that a higher normal or central value for common stocks generally may well be more justified than would be indicated solely by past experience. How much higher? If the D-J, judged solely by past experience, is

worth 450 today, would it be worth 670 or more in the light of these new stabilizing factors? I don't know—and I don't think anyone else knows. My own guess is that under the bull market conditions of today, most financial experts would be inclined to answer yes—thus justifying the present level. But if the market should decline to 450, the same experts will persuade themselves that the old valuation relationships are still valid and that the new ones were only a bull-market mirage.

In support of this rather cynical opinion, let me refer once more to conditions in 1949 just before our great bull market started. The Employment Act was three years old, but it was completely ignored as a stabilizing factor—indeed, organized business was violently opposed to it. What is more to the point is the fact that, as recently as ten years ago, the multipliers or valuation rate for stock earning were the *lowest* for any three-year period in history since the Cowles records began in 1871, except for the World War I years 1916–18, when everyone recognized the earnings to be temporary. Now let us see what one of the leading investment services said about the stock market in September 1949—just before the rise began—when confronted with the current price level of less than 6 times earnings. I summarize their remarks: “Historically the price-earnings ratio is extremely low. Stocks are intrinsically cheap. But the governing factor is public sentiment. Renewal of confidence is needed. Because of these problems, we have for some time recommended that a portion of investment funds be in the form of reserves.” The last sentence is a professional way of expressing a generally bearish view on the stock market.

Now let us contrast this analysis of the record low price-earnings ratio of 1959 with the reaction of another leading service to the near-record-high multipliers in 1959. This service lists the variations in these ratios from 1929 to 1959, and points out that “stocks are now in the upper reaches of the

valuation scale." But then the report adds that business prospects are favorable for 1960, that earnings and dividends should rise further, and "they should support new market pushes." The service does suggest that during future periods of strength, the investor should move away from stocks to a more balanced position between stocks and bonds. This is a mildly cautionary view, and certainly not to be criticized. But the point I do want to make is how weak and equivocal was the reaction of one service to the record-low price-earnings ratios in 1949 and of the other service to the record-high multipliers of today. All my experience goes to show that most investment advisers take their opinions and measures of stock values from stock prices. In the stock market, value standards do not determine prices; prices determine value standards.

Let me return to the question of whether new economic conditions justify higher multipliers of earnings and dividends than in the past. Let us assume, as is likely, that the answer is yes. Would that fact assure the investor against a costly and discouraging bear-market experience? It seems to me that this is most improbable. The central level of values will be raised, but the fluctuations around these levels may well be just as wide as in the past; in fact one might expect even wider fluctuations. For since no one has any clear idea of just how the new central values are to be determined, it will be done by a process of trial and error in which speculative excesses on the upside and undue pessimism on the downside may play an even greater part than in most market cycles of former years.

Speculative Excesses in the Current Market

In this connection, I arrive finally at a "law" about human nature that cannot be repealed and is unlikely to be modified to any great extent. This law says that people without experience or superior abilities may make a lot of money fast in the stock market,

but they cannot keep what they make, and most of them will end up as net losers. (This is true even though the long-term trend of stock prices has been definitely upward.) This is a particular application of a much wider natural law which may be stated simply as: "There is no such thing as a free lunch." A "free lunch," for those too young to remember, was offered in the good old days to patrons of the corner saloon.

The stock market has undoubtedly reached the stage where there are many people interested in free lunches. The extraordinary price levels of stock of rather new companies in the electronics and similar fields, the spate of new common-stock offerings of small enterprises at prices twenty-five or more times their average earnings and three times their net worth (with immediate price advances upon issuance), the completely unwarranted price discrepancies such as those established by speculators between the three issues of Studebaker-Packard—all indicate reckless elements in the present stock-market picture which foretell serious trouble ahead, if past experience means anything at all.

Let me conclude with one of my favorite clichés—the French saying: "The more it changes the more it's the same thing." I have always thought this motto applied to the stock market better than anywhere else. Now the really important part of this proverb is the phrase, "the more it changes." The economic world has changed radically and will change even more. Most people think now that the essential nature of the stock market has been undergoing a corresponding change. But if my cliché is sound—and a cliché's only excuse, I suppose, is that it is sound—then the stock market will continue to be essentially what it always was in the past—a place where a big bull market is inevitably followed by a big bear market. In other words, a place where today's free lunches are paid for doubly tomorrow. In the light of experience, I think the present level of the stock market is an extremely dangerous one.

The Wage-Productivity-Price Issue

JOHN W. KENDRICK

This article clarifies the relationship between productivity, wages, and prices and shows why productivity, at best, is only a rough guide to permissible wage increases.

To avoid upward pressure on prices, government officials and other public figures in recent years have exhorted labor unions and management to hold wage increases within the limits justified by productivity gains. President Eisenhower, for example, said in his 1959 *Economic Report*: "The terms of agreements reached between labor and management in wage and related matters will have a critical bearing on our success in attaining a high level of economic growth with stable prices . . . increases in money wages and other compensation not justified by the productivity performance of the economy are inevitably inflationary."

As early as 1948, General Motors concluded a labor contract with the United Auto Workers which provided for an automatic annual hike in wage rates based on the presumed average rate of increase in national productivity. The productivity factor has entered increasingly into discussions at the bargaining table, and at least indirectly into many labor contracts involving automatic, deferred wage increases. There is, nevertheless, considerable confusion concerning the relationship of productivity to wages and prices and the applicability of a "productivity formula" to wage determinations.

In this article I will treat two main problem areas: first, the largely theoretical question concerning the extent to which average hourly labor compensation can rise in the economy consistent with a stable price level, given the rate of productivity advance. Many of the public pronouncements on the subject imply that wages must rise exactly in pro-

portion to productivity (which is seldom precisely defined).

This implication is not true, no matter which of the major concepts of productivity is used. The first part of the article is an attempt to clarify the inter-relationships among productivity, prices, and wages in the economy as a whole.

Second, I shall treat some of the major difficulties involved in applying a productivity formula to wage determinations in particular industries and establishments. Even if both parties in a collective bargaining situation understand the theoretical interrelationships among productivity, prices, and wages in the economy as a whole and desire a settlement which is noninflationary, there are special factors in each industry and imponderables regarding the future, which make productivity, at best, a rough guide to the permissible wage increase. It is, nevertheless, an important background factor. An analysis of some of the difficulties incurred in trying to apply a productivity formula can make it a more useful guide, although any thought that productivity can provide a precise yardstick for non-inflationary wage settlements is illusory.

I do not wish to consider the question of the extent to which labor unions have the power to push up prices by inflating costs, in effect forcing the monetary authorities to increase the money supply sufficiently to accommodate the resulting higher prices or else risk reducing the volume of output and employment. This possibility is assumed by those who urge wage restraint. Certainly, a

"cost push" is theoretically possible and has probably operated during certain parts of the postwar period, although it is difficult to prove statistically.¹

It should not be forgotten, however, that the more dramatic price rises of the past two decades have been due to excessive increases in money demand, relative to productive capacity, which were sanctioned, if not caused, by actions of the monetary and fiscal authorities. For the purposes of this article, it must be assumed that monetary and fiscal policy is appropriate for attaining the objectives of the Employment Act of 1946 (interpreted to include stable prices). The question to be considered is how can the agreements between labor and management best conduce to these objectives.

The Theoretical Limits of Real Wage Advances

It is a truism that the combined real income per unit of basic labor and capital inputs of the economy must rise precisely in proportion to the increase in productivity, if the variables are consistently defined and measured. To say it another way, the current dollar income (compensation) of labor and capital per hour can increase proportionately with the combined productivity of the two factor inputs and still be consistent with a stable price level. This assumption must be true, since the real income of a community consists of its output.

It is not possible to determine the proportionate increase in average hourly labor compensation that is possible with a given increase in productivity, however, unless an assumption is made as to the rate of return on capital assets. Changes in this rate are related to changes in capital per worker and to the types of innovations that are made. The greater the increase in the real com-

pensation of one of the factor inputs, the less the increase that is possible in the real compensation of the other. The increase in average hourly labor compensation (wages) that is consistent with stable prices can be quantified only if an explicit projection of the compensation per unit of capital (rate of return) is made, as well as a projection of productivity. One reason why it is not feasible to determine the precise increase in wages that is consistent with price stability is because both productivity and the rate of return on capital are difficult to project.

Basic concepts and measures: For this type of analysis, it is necessary to have information concerning the physical volume of both major factor inputs: labor of all types, as measured by manhours worked; and capital, which may be assumed to move proportionately with real stocks of capital (plant, equipment, land, and working capital). It is also necessary to have estimates of output in real terms ("constant dollars") and in current dollar values, one version of which is equal to the sum of factor compensation (or "national income").

Wages, or the "price" of labor, should be figured in terms of the total compensation, including the cost of fringe benefits accruing to employees, per each hour actually worked. In this way, the measure is consistent with the labor input measure, which should also be computed in terms of manhours actually worked rather than manhours paid for. Increases in time paid for but not worked are really a way of increasing the pay for hours actually worked—which represent the real labor service.

Total capital compensation includes interest, rent, royalties, and profit. The "price" of capital may be thought of for present purposes as the rate of return on invested capital, obtained by dividing the compensation by the current dollar value of the stock of capital assets.² The price of capital could be

¹ The theoretical demonstration is provided by Abba P. Lerner, "Inflationary Depression and the Regulation of Administered Price," in the Joint Economic Committee Compendium *The Relationship of Prices to Economic Stability and Growth*, 1958, pp. 257-268. The difficulties of a statistical demonstration are discussed by Lloyd C. Reynolds, "Wage Behavior and Inflation, in *Wages, Prices, Profits and Productivity* (The American Assembly, Columbia University, 1959), pp. 109-136.

² If the average replacement prices of capital goods are rising, the compensation of capital necessary to maintain a constant rate of return must rise proportionately. Thus, in a period of changing prices, the average price level of capital goods as well as the rate of return is reflected in the price of capital.

analyzed in terms of each of its components, but it is simpler to treat it as a whole.

Output in relation to measures of the inputs of labor and capital (the basic "factors of production") combined in proportion to their relative compensations is called "total factor productivity." It shows the net savings achieved in utilization of the inputs over time and thus the increase in productive efficiency. This cannot be said of the more conventional "output per manhour" measure, which is influenced by changes in the amount of capital used per manhour as well as by changes in productive efficiency. Neither can it be said of the other broad "partial productivity ratio," output per unit of capital input. That ratio does not measure the efficiency of capital goods as such but also measures the substitution of capital for labor and the rate of utilization of capital stocks. The output-capital ratio, however, is a necessary complement to the output-per-manhour ratio.

Information on output and manhours alone does not permit us to calculate the increase in labor compensation compatible with stable prices, since it is not known how much real income is necessary to compensate added amounts of capital assets used in production or to change the rate of capital compensation if this should become necessary to maintain stable growth.

Measurement of *both* inputs makes it possible to calculate the increase in income required to compensate the increased volume of inputs at the rates of compensation of any given base period. The "productivity increment" may be defined as the difference between the total change in real income or product and the change required to compensate added inputs. Knowing this increment, the analyst can then calculate the feasible increase in average hourly labor compensation with any given rate of return on capital. The trick is in estimating the size of the pie (i.e., the productivity increment) which is produced in each period. Then, by assuming the size of the slice going to one of two

claimants, the size of the slice available for the other claimant is readily calculated.

How Much Has Productivity Increased?

What has actually happened in the United States private domestic economy since World War I? Combined input of labor and capital in real terms increased by 1.0 percent a year, on average, which indicates by how much factor compensation would have risen if there had been no change in prices of the factors. Real national product rose by 3.1 percent. Thus, output per unit of total input, or "total factor productivity" increased at an average rate of 2.1 percent a year over the 38-year period 1919-1957.

What happened to the increment in real national product resulting from the compounding of this 2.1 percent-a-year productivity advance? Although our measures are rough, it appears that there was virtually no change in the rate of return on capital. Thus real capital compensation rose only in proportion to the increase in real capital stocks and less than the increase in output per unit of capital input, which averaged 1.3 percent a year. Thus, practically all of the productivity increment accrued to labor.³

In terms of average rates, real average hourly labor compensation increased by 2.8 percent a year compared with annual increases in total factor productivity of 2.1 percent, in output-per-unit-of-labor input (weighted manhours) of 2.3 percent, and in output per manhour (unweighted) of 2.6 percent.⁴

The basic explanation of the fact that real wages rose faster than productivity lies in the

³ The proportion is 99 percent, according to calculations presented in my forthcoming book, *Productivity Trends in the United States*, to be published for the National Bureau of Economic Research.

⁴ When manhours worked in each of the major industries of the economy are weighted by the average hourly earnings of a base period, the weighted aggregate increases more than unweighted manhours due to relative shifts of workers to higher-paying industries. Thus, output per weighted manhour rises less than output per unweighted manhour. The weighted measure is more appropriate in wage analysis, since increases in productivity due to interindustry shifts are not available for increasing wage rates *within* given industries. For simplicity, we use the term "output per manhour" in this article to mean "output per weighted manhour."

considerably faster increase of capital than of manhours worked. Economic theory would lead us to expect the growing relative abundance of capital to be associated with a greater increase in the price of labor than in the price of capital. As long as output per unit of capital rises more than the rate of return on capital, it is possible for real average hourly labor earnings to rise more than output per unit of labor input. Since, however, the compensation of capital is only about one-fourth as large as labor compensation in the U. S. private economy, the extent to which wages can be supplemented from capital compensation over and above the increase in "labor productivity" is not large.

If real capital stock and input rise more than output (as happened to a small degree between 1953 and 1957), average hourly labor compensation would have to rise by less than output per manhour unless profits were squeezed and/or final prices increased. During some periods, such as the decade 1937-47, real capital stock per manhour actually dropped, and the resulting increase in the rate of return on capital exceeded the increase in the output-capital ratio. In that situation, real wages also rose by less than output per manhour, and the share of labor in the national income temporarily fell.

A Generalization: The foregoing analysis can be summarized in terms of the following proposition: *Average hourly labor compensation can rise percentagewise by more (or less) than the increase in output per manhour to the degree that output per unit of capital input increases more (or less) than the rate of return on capital* (when the percentage point difference is weighted by the ratio of real capital to labor input in the current period) and still be consistent with a stable price level. This is considerably different from the usual over-simplified proposition that wage boosts must parallel advances in output per manhour if prices are to remain stable. Only in the special case in which output per unit of capital remains constant can wages increase precisely in proportion to the increase

in output per manhour and be consistent with a constant rate of return on capital and stable prices. (See Appendix.)

Only if output per unit of capital input actually falls must real average hourly labor compensation rise by less than output per manhour, if the rate of return on capital remains unchanged. This last proposition underlines the fact that it is to the advantage of labor for innovations to be capital saving as well as labor saving.

Although we have assumed constancy of the rate of return on capital in these cases, over intermediate periods of time increases, or decreases, in the rate of return are indicated by economic forces. This factor complicates the problem of using a productivity formula in wage determination, as we shall see in the next section.

Problems of Applying the Formula

Even if the relationship between average hourly labor compensation and productivity within a framework of stable prices were generally understood, there would be difficulties in applying the formula to particular collective-bargaining situations. It is necessary to be clear as to the sector to which the productivity index should relate and the appropriate wage measure. Serious problems arise in projecting changes in productivity and rates of return into the future and in the provision for industry or occupational deviations from an average wage increase in order to preserve structural flexibility in the labor market. These difficulties are in addition to the fact that margins of error in available estimates of productivity may be substantial.

The relevant sector and wage measure: It is the rate of increase of productivity in the whole economy rather than that of particular firms or industries that is relevant to wage determination. If productivity change in individual firms or industries were used as guides in those firms and industries, the whole wage structure would soon be thrown completely out of kilter since there is wide dispersion in rates of productivity change.

This fact is generally recognized by unions and managements. The historical record shows that there is no significant degree of correlation between relative changes in wages and productivity. Consequently, there is a significant negative correlation between relative changes in productivity and in prices. The firms in those industries with greater than average productivity advance have shown relative price declines over intermediate or longer time spans, and their relative sales have increased. In this way, the price system serves an allocative function which would not be possible if relative changes in factor prices reflected productivity changes by industry. This is not to say that some dispersion of wage rates by industry is not necessary—it is, and creates difficulties in applying a productivity formula.

A formula increase in wages consistent with stable prices, assuming a given productivity trend, must be applied to the *total* labor compensation per manhour. That is, the productivity-based factor cannot be superimposed on other types of increases and still remain consistent with stable prices. It is the cost of an entire "package" per manhour that must be measured against the formula. For this reason, it may be questioned whether an "annual improvement factor" as such should constitute part of a labor agreement, since it is likely to be merely part of a larger package, as in the case of the United Auto Workers agreements. It may well be better to keep the adjusted productivity criterion as a background factor to provide a range within which the over-all increase in average hourly labor compensation can be negotiated. The productivity factor is a particularly pertinent background factor for determining the size of deferred wage increases in long-term agreements.

Need for projection: The present average wage increase in the economy which is consistent with stable prices depends not on *past* productivity increases and changes in rates of return on capital, but on the *future* changes. During the business cycle, there is

some variability in productivity change, and much volatility in rates of return on capital. Roughly speaking, rates of return tend to increase rapidly, and then more slowly during the expansion phase of the cycle; in contraction, they shrink rapidly at first, and later tend to stabilize. Output per manhour rises during expansion, but at a decreasing rate. In early contraction, it levels off, but increases significantly in the final phases of contraction.⁵ Total factor productivity shows greater variability. These patterns naturally vary from one cycle to another. It would be extremely difficult, even if all parties concerned had the necessary control and purpose, to vary wage-rate changes in such a way as to maintain a stable price level from year to year.

Trend-rates of change are much more stable. Over decadal periods, average annual rates of increase in total productivity have varied from the long trend by only 0.2 percentage point, on average. Continuous, reliable estimates of rates of return are not available, but it seems probable that decadal variations from their horizontal trend, although undoubtedly larger than in the case of productivity change, fall within a very few percentage points.

In this connection, it should be noted that to the extent a wage increase in any single year is based on an underestimate or overestimate of the actual productivity change, cost-of-living wage adjustments would tend to compound the difference. Whatever their other merits may be, it should be recognized that cost-of-living adjustments promote price instability.

By basing wage-rate boosts on the *past trend* rates of change in productivity and the rate of return on capital, it is likely that a fair degree of price stability *over the cycle* could be achieved, since sharp changes in trend are uncommon. This formula would mean that prices would probably rise somewhat in the latter phase of expansion, and fall some-

⁵ See Thor Hultgren "Cyclical Changes in Labor Cost," in the Joint Economic Committee Compendium, pp. 211-224.

what in the latter phase of contraction. It is possible to argue that some cyclical price variation is desirable, so long as it is generally reconized that variations will be mild. But price stability could not be expected to be complete, even over the cycle.

Aside from the usual deviations from the trend rate, it is always possible that the total productivity trend may show acceleration, or deceleration. It appears that productivity advance did accelerate around the time of World War I, and output per manhour has accelerated a bit since World War II, largely because of an acceleration in the growth of capital per manhour. In my judgment, there is no evidence of renewed acceleration, but if this should happen, wage-rate changes could be adjusted accordingly once the break in the secular rate were apparent.

There have been occasional relatively sharp changes in the rate of return on capital within decadal periods. There was, for example, a decided drop after 1948 when the postwar capital shortage was still severe and returns were abnormally high. The rapid increase in the capital stock relative to the slowly growing labor force brought capital returns down rather steadily. For the decade of the 1960's, however, the prospective acceleration in growth of the labor force poses the possibility that the equilibrium rate of return may well tend to rise, given a constant saving propensity of our economy. If this proves to be the case, the increase in real average hourly earnings will be less than the 4 percent per annum experienced over the past decade when those earnings were augmented by a declining rate of return on capital. Allowance for this sort of development would obviously be practically impossible to include in labor contracts, but the effect would show up in competitive market prices.

The firm or industry versus the economy: Over the long run, average hourly labor compensation in the various occupations and industries of the economy have tended to move more or less in step. Even in the long

period, however, the wage structure has changed to some degree, reflecting changes in basic forces of demand and supply in the labor market.

In periods of a year, there is generally considerable variation in changes in average hourly earnings in the various occupations and industries. The firms in industries whose sales are increasing relatively may have to increase wage-rates more than the national average in order to attract the necessary labor force, and conversely with the firms in declining industries.

Within firms, of course, changes in the occupational wage structure will differ depending on the strength of demand relative to supply in the effective labor markets for the various occupational specialties. Over the long run, however, divergences in wage-rate change cannot continue indefinitely without correction so long as the industries or occupations with relative pay decreases need to retain significant numbers of workers.

In the short run, it is apparent that the economy-wide average increase in hourly labor compensation consistent with price stability can serve only as a rough general guide to the increases appropriate in particular firms, or in particular industries where bargaining is on an industry-wide basis. The actual increases will have to be more or less than the indicated average depending on particular market situations, if structural flexibility in the economy is to be maintained.

Conclusion

In view of all the difficulties involved in devising and applying a productivity-based formula for wage determination, of which we have mentioned only a few, the reader may be ready to throw productivity out the window as a practical guide in specific situations. Even with the best of intentions on the part of all concerned, and given the best of monetary policies, it is clear that a productivity formula cannot be expected to conduce to perfect price stability in the short run, and possibly not in the longer run.

I believe that the concept of the productivity-connected wage increase consistent with price stability is nonetheless an important background factor in labor negotiations. Even though the average increases in wages consistent with stable prices may exceed the expected increase in total factor productivity or even in output per manhour, it is still true that real wage increases are limited by the extent of productivity advance. Recognition of this fundamental fact, coupled with a will on the part of both unions and managements to avoid significant price inflation, could result in average wage boosts in the general range of those consistent with reasonable price stability. I certainly think that proper regard for the productivity factor could mean substantially less price inflation than the almost 2 percent-a-year rate we have averaged since 1946. In view of the ambiguities and upward biases that attach to all of our general price indexes, anything less than 1 percent a year, on average, comes close to "reasonable price stability" in the eyes of many economists.

APPENDIX

Illustrative Cases

The reader who wishes more fully to understand the basic theoretical proposition of this article may find it helpful to work through the following explanation which is centered around some simple arithmetic examples. The cases are hypothetical, but Section C of the Table is set up to reflect actual tendencies in the American economy.

The cases are confined to the private domestic economy, thus excluding the direct effect of governmental claims on resources and changes in net income from abroad. National product is defined so as to equal national income (factor cost), which means that depreciation is excluded, and the prices used as weights to calculate "real product" are net of indirect business taxes and subsidies. Further, we ignore the possible effect of relative changes in factor prices on the

quantities of factors used in production. That is, we take certain changes in factor inputs as given and then indicate some alternative relative changes in factor prices consistent with general final price stability. The actual relative changes in factor inputs and prices will depend on shifting market forces; we are concerned to demonstrate how, under certain (realistic) conditions, average hourly earnings of labor have risen by more than output per unit of labor input, and to generalize by how much more (or less, if relative input movements were reversed) they have risen.

In Section A of the table, we first show the factor inputs in terms of the national income (which equals the national product "at factor cost") holding the prices of the factors constant as of Period I. Thus, between Periods I and II, manhours worked remain the same, while the real value of capital assets double. Since labor compensation comprises the bulk of national income in the base Period I, total factor input rises to only 120 percent of the base. We further assume an increase to 240 percent in real product—i.e., the physical volumes of outputs valued at Period I factor costs (prices). Thus, there is a doubling of total factor productivity—which represents a weighted average of the increase in output per unit of labor input and the increase in output per unit of capital input. It should be emphasized that the "partial productivity" ratios do not measure the specific efficiency of the particular class of input; they measure the savings in the input per unit of output achieved over time as a result of increasing productive efficiency augmented (or offset) by factor substitutions. Total factor productivity measures the net saving of tangible factor inputs and thus the increase in productive efficiency.

The absolute productivity increment in this case is \$120, the difference between real product and real cost defined as factor input at base-period earnings rates or prices. If factor prices remained unchanged, it would be possible to reduce product prices

TABLE I
INPUT, OUTPUT, PRODUCTIVITY, AND PRICES UNDER VARYING ASSUMPTIONS
AS TO FACTOR PRICE CHANGES

Line No.		Periods		Index Number (II/I×100)
		I	II	
	A. National income or product at constant factor prices			
1	Labor compensation.....	80	80	100
2	Capital compensation.....	20	40	200
3	Total income or product (1 + 2).....	100	120	120
4	National product at constant prices.....	100	240	240
	Productivity:			
5	Total factor productivity (4 ÷ 3).....	...	...	200
	Partial productivity:			
6	Labor (4 ÷ 1).....	...	...	240
7	Capital (4 ÷ 2).....	...	...	120
8	General Price Level (3 ÷ 4).....	...	...	50
	B. Rate of compensation of each factor rises with the corresponding partial productivity ratio			
9	Labor compensation (1 × 6).....	80	192	240
10	Capital compensation (2 × 7).....	20	48	240
11	National income or product.....	100	240	240
12	General Price Level (3 ÷ 11).....	...	...	100
	C. Price of capital stays constant and entire productivity gain goes to labor			
13	Labor compensation (15 - 14).....	80	200	250
14	Capital compensation (2).....	20	40	200
15	National income or product (4).....	100	240	240
16	General Price Level (3 ÷ 15).....	...	...	100

by one half (the reciprocal of the twofold increase in total productivity). But since our interest is in a stable *product* price level, the question is how might the productivity increment be divided between the factors. Section A has merely set the stage for consideration of this problem. The realistic assumptions have been made that capital rises more than labor input, but that output rises more than both major inputs.

Section B presents one possible solution to the distributive problem, interesting as a special case. Here we assume that the price of each of the factors rises in proportion to the increase in the corresponding partial productivity ratio. Thus Period II labor input of 80 is raised by 140 percent, while Period II capital input of 40 is raised by 20 percent,

corresponding to the increases in labor and in capital productivity respectively.

The outcome of this convention is interesting. The shares of the factors in the national income remain constant (as they must if the "elasticity of factor substitution" is unity). If real capital stock had increased as fast as real product (as happened for part of the postwar period), i.e., if output per unit of capital input had remained constant, then by this convention the rate of return on capital would also have held constant and the entire productivity increment would have gone to labor. Over longer periods of time in the United States, however, output per unit of capital input has risen somewhat—but the rate of return on capital has remained relatively constant between years of high-level

economic activity. This means that technological advance has approximately offset the tendency towards diminishing return as capital per manhour has grown. It is hard to imagine a continuing increase in the rate of capital return, since this would stimulate capital formation which would eventually act to reduce the rate of return.

In Section C we have tried to approximate the realistic long-run trends, and assume that the rate of return on capital remains constant. In this case, *all* of the productivity increment goes to labor, and average hourly labor compensation rises by ten percentage points *more* than output per unit of labor input. This illustrates the generalization made in the body of the article: *Real average hourly labor compensation can rise percentagewise by more (or less) than the increase in output per man-hour to the degree that output per unit of capital input increases more (or less) than the rate of return on capital* (when the percentage point difference is weighted by the ratio of real capital to labor input in the current period). Thus, in our example, the ten percent increase in average hourly labor compensation over and above the percent increase in output per manhour is equal to

the 20 percent increase in output per unit of capital input reduced by the .5 ratio of real capital to real labor cost in Period II (40/80).

We indicated in parentheses that average hourly wages would rise by less than output per manhour if output rose less than capital and the rate of return were constant. This situation has occurred at times in the past, and may again in the future. The reader can work out this case for himself by substituting 60 for 40 as Period II real capital cost in panels A and C of the table.

The *actual* increase in average hourly labor earnings relative to the rate of capital compensation will depend not only on the increase in the quantity of capital per manhour, but also on the "elasticity of factor substitution." Between 1937 and 1957, on average, according to my calculations for the National Bureau of Economic Research, a relative decline in labor input of 1.0 percent was associated with a relative increase in the price of labor of 3.2 percent. This relationship is, of course, subject to change, which is a chief reason why the wage boost consistent with stable product prices cannot be predicted precisely.

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Collective Bargaining and Inflation

LLOYD ULMAN

Decentralization of collective-bargaining powers of trade unions is not the way to curb inflation. Neither is public-policy restraints on money demand. This article suggests another way.

Author's Note: The following paper, which was offered in testimony at the Joint Economic Committee's hearings on "Employment, Growth, and Price Levels," deals with certain aspects of this country's wage-setting institutions which, in the writer's opinion, have contributed to the upward pressure on prices in the postwar period. One group of economists believes that the postwar inflationary pressures have originated on the demand side of product or final service markets and that cost increases have virtually all been caused by the "pull" of an excess of business and government demand over available supplies of resources. Within this group, many economists believe that the excess demand could be blotted up by sufficiently resolute monetary policy so that prices could be stabilized without a resulting cost in unemployment.*

But another group of economists holds that not all inflationary pressures have originated on the demand side of product markets; and that our price and wage-setting institutions—in particular, trade unions—have contributed independently to the upward movement of prices. If the postwar inflation has reflected a mixture of "institutional" and "classical" agents, then monetary policy could not act to reduce costs as easily as it could reduce money demand, so that it would generate more unemployment as it

checked the rise in prices. Thus the debate over the causes of inflationary movements since World War II has quite important implications for public policy.

The following paper argues that trade unions have exerted independent upward pressure on wages and prices in the past, but it concludes that their over-all impact might reasonably be expected to decline in future years.

TO: THE JOINT ECONOMIC COMMITTEE, SEPTEMBER 29, 1959

There has been a difference of opinion among economists—perhaps only among economists—as to whether the negotiation of wages under collective agreements covering slightly over one-third of the nation's non-agricultural employees has constituted one of the forces contributing independently to the upward movement in prices in the period following the end of World War II. Attempts to test this hypothesis have thus far failed to uncover any single satisfactory yardstick. Comparisons between union and nonunion wage movements, comparisons of movement in wages, prices, productivity, and unit labor costs, the presence or absence of reported shortages of labor, of wage "glides" or "slides" above contractual rates, or of a high degree of unemployment—each has failed as a sufficient criterion in itself because none can provide evidence which is inconsistent with either (a) the proposition that collective bargaining has contributed to wage and price inflation or (b) the proposition that recorded

* Others, however, hold that inflation cannot be eliminated by reducing the supply of money either because money substitutes—such as short-term government securities and savings deposits—are available to the public or because price increases in the more rapidly growing sectors of the economy are not matched by price declines elsewhere.

increases in wages and prices have been due solely to other causes—such as consumer spending out of accumulated liquid assets in the immediate postwar period, the growth in population, and increased government spending on defense and farm price support programs. I should like to dwell briefly on certain characteristics of our wage-setting institutions, which might aid us in evaluating the statistical measures and to assess their relationship to either established public policy or proposed changes therein. These characteristics are (1) decentralization of union power and freedom of employee choice, (2) decentralized bargaining in concentrated industries, (3) some other aspects of the industrial environment of trade unions, and (4) reactions in the nonunion sectors. Under the first heading we shall try to explain the propensity of American unions to push so vigorously for higher money wages; in the second and third areas, we shall explore some of the opportunities and obstacles which affect their ability to raise the wages of their members; and in the fourth, we allude briefly to some forces which tend to magnify, and others which tend to offset the impact of union-won wage increases.

Union Power Decentralized

Where, as in some foreign countries, collective bargaining is highly centralized and central federations of trade unions are influential in the determination of wage rates in particular industries, it has been at least possible for both employer and union groups to be influenced (restrained) by the probable impact of their decisions upon the economic welfare of the entire country. Moreover, negotiated wage changes in such centralized systems frequently reflect the mediating influence of governmental authority; the labor movements in such countries depend heavily for the advancement of the interests of their membership on their associated labor parties and upon what the Webbs termed the "method of legislative enactment." American unionists, on the other hand, have, for a

variety of reasons, placed much more emphasis on self-help through collective bargaining; and this has resulted in a weak central federation—weak in the sense that it exerts no control over the economic activities of the national unions affiliated with it.

As a result, union bargaining policies are made by a large number of units—there are, e.g., over 180 national unions in the United States—no one of which is able to formulate its own decisions in the light of the economic requirements of the country as a whole.

To be sure, the degree of decentralization of authority within the trade-union community was and is limited. Among the older unions, emphasis on collective bargaining decreed that with the widening of labor and product markets and the growth of multi-plant firms (and their equivalents in construction and transport), power should pass, in varying degrees, from local unions up to the internationals. In some of the newer C.I.O. unions, which were organized by the parent federation, power rapidly passed down to the national level. Not infrequently, the national unions used their power to restrain subordinate locals from pressing for wage increases or working rules which would put their employers at a serious competitive disadvantage or, on the other hand, which would put their members "out of line" with members in other locals. And, if the national official was in no position to see the economy as a whole, he was better able than the local membership to see his occupational or industrial jurisdiction as a whole, including the limits to what the traffic would bear. Moreover, the national unions agreed in principle to limit *de facto* decentralization in one important area. It was agreed that each national union should exercise "exclusive jurisdiction" over some defined occupational area. This rule was frequently honored in the breach by rivals for jobs or members, but, even so, such rivalry often took the form of competitive underbidding of wages to "organize the employer" rather than of competitive raising of wages to win the favor of their employees.

However, modern public policy, reaffirmed in the Taft-Hartley Act of 1947, and again in the legislation recently enacted, has tended to weaken some of the self-imposed limitations upon decentralization. By attempting to place the question of bargaining representation within the sole and protected domain of the individual employees in the bargaining unit, it placed a premium on interunion competition for members which, in view of the employer's enforced neutrality, has most frequently taken the form of competitive bidding up of wages and other standards of employment, rather than of underbidding.

Partly in an effort to cope with the problems presented by this public policy, the federations and many unions have entered into no-raiding agreements, and some unions have even embarked on joint bargaining ventures; but very serious jurisdictional rivalries still continue. And even where no rival union is in sight, the union on the premises is kept on its toes by the existence of the employees' legally available alternative of choosing "no union."

In placing certain restrictions on organization picketing, the Labor-Management Reporting and Disclosure Act of 1959 may reinforce the efforts of the AFL-CIO and of some of its affiliates to reduce jurisdictional competition. But in so far as the new law is effective in making the union leaders more responsive to the membership—whether by striking at such abuses as "sweetheart agreements" and "conflicts of interest" or by strengthening democratic procedures within unions—it may strengthen the wage-raising propensities of these organizations. On a prior occasion I raised the possibility that reform of union government might entail some economic cost in terms of higher wages and prices, but I omitted two highly relevant points. The first is that the above argument assumes that the members themselves continue to seek money wage increases as ardently as they have in the past. The second is that the analysis does not, of course, imply

that the cost outweighs the benefit to the entire community from further implementation of the national labor policy of the past quarter-century.

Decentralized Bargaining in Concentrated Industries

At the end of the war not a few observers predicted the widespread extension of industrywide bargaining. Some feared that industrywide bargaining would increase the bargaining power of unions; since each employer would be certain that his competitors would settle with the national union on terms no more favorable than his own, every employer's effective will to resist would be sapped. Now it might appear that these observers, like the legendary first baseman of the Brooklyn Robins, were looking in the wrong direction, although it is true that multi-employer bargaining on a locality-wide or regional basis has grown since the war, especially where the firms involved are small, mobile, confronted with high labor-cost ratios, and very competitive.¹

But multi-employer bargaining in the manufacturing sector of the economy actually declined in coverage between 1947 and 1956, while companywide bargaining by large multiplant firms grew more popular in the postwar period. In large-scale industries unions were frequently able to achieve under company-by-company bargaining many of the same results by way of "taking labor out of competition" which were generally claimed for industrywide bargaining; these sometimes included the reduction or elimination of interplant and even interfirm wage differences and the negotiation of uniform increases in wages. Furthermore, companywide bargaining has held certain advantages for the unions over industrywide bargaining. In the first place, in such oligopolistic industries as autos, aircraft, rubber, and glass, unions have frequently been able to avoid

¹ Frank C. Pierson, "Prospects for Industry-Wide Bargaining," *Industrial and Labor Relations Review*, vol. 3, no. 3, April 1950, pp. 340-361.

industrywide strikes. Selective striking places a union in a stronger financial position than industrywide striking. Nor does it stiffen employer resistance to union demands, for the employer can be virtually as certain under company-by-company bargaining as by industrywide bargaining that the national union with which he deals—or an eager rival union—will negotiate with his important competitors the same settlement (in terms of cost) which he will make himself. On the contrary, employer resistance tends to be sapped by the whipsawing potentialities of the piecemeal approach; fear of losing one's historic "share of the market"—either to existing competitors or (as in the case of the automotive components industries) to do-it-yourself customers—makes any and every firm in the industry especially reluctant to take a strike when important rivals are not shut down.

Decentralized bargaining has also benefited stronger and more efficient firms by permitting them some freedom of action. Under industrywide bargaining, they might be prevented from taking a long strike because of the inability of the weaker firms to hold out against the union. Conversely, under industrywide bargaining, they might be obliged to shut down because the high-cost firms are unable or unwilling to pay the price of peace. (Under decentralized bargaining, on the other hand, General Motors was not prevented from peacefully concluding a long-term agreement with the Auto Workers in 1950 while Chrysler was on strike.) But when larger or more efficient firms are more determined to resist union demands, it would appear that the compensations of decentralization to employers are outweighed by its disadvantages. Greater attempts by employers to present a united front in the automobile negotiations and during the airlines strike (when an income-sharing pool was formed) in the recession of 1957-1958, and the recently announced strike-insurance plan of the railroads suggest that industrywide bargaining, at least on a *de facto* basis, might

yet live up to the early claims of popularity made on its behalf.

Should such attempts be discouraged by legislation to outlaw industrywide bargaining or to fragment the national unions? Supporters of these proposals might point to the extremely high wage increases which have been registered under industrywide bargaining in even a declining industry like coal or, on a *de facto* basis, in steel. Moreover, fragmentation of the national unions might weaken their present components financially (although it might be noted that the Steelworkers do not have a regular system of national strike benefits). And in certain highly competitive, nongrowth industries like the garment trades the elimination of industrywide bargaining and/or the dismantling of the national unions therein would, in all probability, be effective in reducing union bargaining power.

But in the latter industries wages have not risen at all rapidly; and neither national unions nor elaborate apparatuses of industrywide bargaining have been able to prevent the emergence of nonunion competitors with lower labor costs in industries where entry is so easy. On the other hand, in less competitive industries characterized by larger, more profitable, and fewer units of enterprise, it is extremely doubtful whether the proposed changes would accomplish much beyond the elimination of some of the smaller and weaker firms by locals presently chafing under such restraints as existing national authority has been able to impose. We must recall that many existing inequalities in labor costs are due to differences in efficiency—in work rules rather than in basic wage rates, where the latter are negotiated by the national union while the former are the jealously guarded prerogatives of the locals whose dubious successes have varied inversely with the ability of the employer to pay—or resist. As for the firms of average financial strength and operating efficiency, they would presumably be confronted by piecemeal pressure from companywide unions uncoordinated by

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national authority, but anxious to equal one another in securing higher standards of employment.

Thus, it is questionable whether most employers in large-scale industries would gain more bargaining strength than they would lose by the extension of the antitrust laws to the areas of industrywide bargaining and union structure.² On the other hand, if, as we shall presently argue, the degree of competition in product markets is an important determinant of union bargaining strength, more vigorous enforcement of antitrust legislation in product markets would be a more effective, although indirect, means of curbing the ability of some of our largest national unions to push up wages, costs, and prices. Measures to liberalize international trade would have the same effect, and efforts by both business and union groups to secure increased protection from increasing competition from abroad should be firmly rebuffed.

Indeed, it may not be unreasonable to expect that increased competition in product markets, apart from limiting union power, might tend to divert some of the employer response to union pressure on costs from price increases into the channel of increasing efficiency.

The Industrial Environment

While it is generally agreed that unions in the building trades, printing trades, railroads, and other so-called "crafts" have great bargaining strength, the bargaining power of the so-called "industrial" unions in the manufacturing sector has been called into question. In some important respects, the environment of the latter has certainly tended to restrict their ability to raise wages. Under the impact of shifts in consumer demand to services and products of "tertiary" industries and of labor-displacing innovation, the demand for production labor in manufacturing has not kept

pace with the demand for non-agricultural labor as a whole. And partly because the level of manufacturing wages is relatively high, no over-all stringency in the labor markets involved has developed to provide the unions with a favoring tailwind. Moreover, the services of semiskilled production workers are not as essential to the production process or, perhaps, as subject to restriction in supply as are the services of skilled unionists. And in some of the industrial jurisdictions, labor-cost ratios are high (although, on the whole, labor-cost ratios in industrial-union jurisdictions are at least as low as those in industries organized by the crafts referred to above).

However, other characteristics of some of the major industrial union jurisdictions tend to compensate for these restraints on union bargaining power. We have already referred to high ratios of concentration; the existence of formidable technological or pecuniary barriers to entry of new firms can provide insulation against the emergence of nonunion competition and compensate for a union's inability to restrict the supply of labor in a semiskilled field.

Moreover, the greater technical substitutability of semiskilled production workers is neutralized to some extent, for industries making the substitutes (e.g., machine tools) are also organized, so that their labor costs and prices move upward in some correspondence with the wages of the union workers in question. And while the displacement of union labor due to technological innovation is indeed characteristic of industrial jurisdictions, unions have not been prevented thereby from pushing up wages. *On the contrary, it would appear that some industrial unions have exploited above-average rates of growth in output per manhour, which might otherwise have tended to depress wages by reducing demand for labor in negotiating wage increases* part of which were thus not reflected in higher unit costs to the employers. This, together with the ability of firms in concentrated industries—and espe-

² For a similar conclusion proceeding from a different line of analysis see John T. Dunlop, "Policy Problems: Choices and Proposals," in *Wages, Prices, Profits, and Productivity* (The American Assembly, 1959), pp. 146-147.

cially in industries for whose products no close substitutes existed, to raise their prices with relative impunity, helps to explain how wages in the highly unionized manufacturing sector, where the demand for labor lagged, were able to keep up with wages elsewhere in the economy—including those service trades where the demand for labor was very strong and which are lightly organized.

To the extent that wage increases have helped to prevent prices from falling in industries where demand for labor has been growing slowly but productivity has been growing rapidly, the influence on the aggregate level of prices has been inflationary. This has prompted the Chairman of the Council of Economic Advisers to urge upon unions and managements in such industries a policy characterized both by the negotiation of wage increases below increases in productivity and by price reductions. Whether managements in administered-price industries would have been willing to reduce prices if they had been able to negotiate smaller wage increases in the past is problematical; the steel industry's negative response to suggestions that it cut prices if it could negotiate a standstill agreement in wages was disappointing. On the other hand, certain spokesmen from industrial union groups have issued statements in the past which contained proposals not too dissimilar from Professor Saulnier's. The prospects of success, while hardly overwhelming, should nevertheless warrant continued public pressure. I firmly believe, however, that such pressure should stop definitely short of governmental controls over wages and prices, in my opinion, the damage (both economic and political) from creeping controls would outweigh by far the damage from creeping inflation.

The Splash and the Ripple: Secondary Effects of Union Wage Increases

The total impact of collectively bargained wage increases upon the over-all levels of wages and prices depends upon how and to

what extent the wages of nonunion workers are affected thereby. Most observers and practitioners in the field of industrial relations believe that, just as certain "key" bargains are copied more or less faithfully by other unions and managements, so union-won wage increases "ripple out" over the nonunion sectors. In this connection, I shall refer very briefly to three mechanisms which can generate such secondary effects and which have been discussed in the literature.

The first two indicate how collectively bargained wage increases could result in increased demand for nonunion labor and in a rise in nonunion wages and prices. In the first place, if prices in unionized industries rise relative to prices in the nonunion sector, consumers would tend to substitute nonunion-made goods for union-made goods to some extent.³ In the second place, if bargained wage increases result in higher payrolls and total expenditures by the firms involved, part of the increase in wage incomes will be spent on products and services in the nonunion sector.⁴ Third, employers of nonunion labor raise wages in their own plants in order to avert a decline in employee morale and efficiency and, in some cases, to keep unions out.⁵

The magnitude of the secondary effects of collectively bargained wage increases depends in part both on the mobility of labor between the union and nonunion sectors and on the size of the unionized sector. The non-

³ J. R. Hicks, "Economic Foundations of Wage Policy," *The Economic Journal*, vol. LXV, no. 259, September 1955, pp. 397-398; L. Ulman, "Marshall and Friedman on Union Strength," *Review of Economics and Statistics*, vol. XXXVII, no. 4, November 1955, pp. 395-399; A. P. Lerner, "Inflationary Depression and the Regulation of Administered Prices," *The Relationship of Prices to Economic Stability and Growth*, Joint Economic Committee, 85th Congress, 2nd Session (Washington, 1958), pp. 265-266.

⁴ J. R. Hicks, "The Instability of Wages," *The Three Banks Review*, March 1956, no. 29, pp. 12-14; S. H. Slichter, "Labor Costs and Prices," in *Wages, Prices, Profits, and Productivity* (see note 2), pp. 172-176.

⁵ S. H. Slichter, "The Current Labor Policies of American Industries," *Quarterly Journal of Economics*, vol. XLIII, May 1929, pp. 393-435; Lloyd G. Reynolds, *The Structure of Labor Markets* (New York: Harper, 1951), pp. 219-220; J. S. Duesenberry, *Business Cycles and Economic Growth* (New York: McGraw-Hill, 1958), pp. 305 and 307, and "Underlying Factors in the Post-war Inflation," in *Wages, Prices, Profits, and Productivity*, pp. 83-84; see also the testimony of Professor H. P. Minsky, University of California, Berkeley, before this Committee.

union wage-and-price-raising mechanisms referred to above could be offset by a sufficiently large increase in the supply of non-union labor, if the bargained wage increases resulted in a sufficiently great reduction in employment and if enough redundant workers applied for jobs in the nonunion sectors. However, union jobs are high-wage jobs and their consequent attractiveness, combined with nontransferability of skills, limit the willingness and ability of union jobholders to move. Evidence of such immobility is found in the prevalence of sharework and makework rules and the opposition which they arouse among employers. Such rules not only increase costs directly; they help to ensure that the secondary effect of union-won increases in wage rates will be inflationary rather than offsetting. Moreover, the fact that one out of every three nonfarm wage earners is a union member should suggest that the over-all contribution of collective bargaining to the upward movement of wages and prices is appreciable.

If, as I believe, the processes of inflation in the postwar period have not all been of the so-called classical variety, they could not be neutralized by sufficiently vigorous monetary or fiscal policies without reducing employment and slowing down the rate of economic growth. For while such policies could remove the inflationary increases in demand generated by collective bargaining, they could not roll back to an equal extent the simultaneously induced increases in costs.

Conclusions and Prospects

Although one cannot tell exactly what would have happened to wages and prices in the absence of collective bargaining, it is necessary for responsible government officials to make an educated guess, the nature of which will presumably affect certain economic policies which they will recommend and formulate. In view of some of the characteristics of trade unions, collective bargaining, and product and labor markets to which I have referred, it is, in my opinion, reason-

able to assume that collective bargaining has contributed to the upward movement in wages and prices in the postwar period. I also conclude that policies designed to decentralize bargaining within the limits contemplated by their proponents would not, on the whole, reduce this upward pressure on costs and prices, although policies designed to reduce barriers to entry in product markets might have this effect. Moreover, I believe that, while policies designed to restrain aggregate demand could reduce the pressures on collective bargaining, they would also reduce our rate of economic growth and would result in politically unacceptable levels of unemployment.

In this connection, it is relevant to note that all the years in which hourly earning in manufacturing (exclusive of overtime) rose by 3½ percent or less were all years of relatively high unemployment 1949-50, 1953-54, 1954-55, and 1957-58. In 1949, the average rate of unemployment was 5.9 percent; in 1954, 5.6 percent; in 1955, 4.4 percent; and in 1958, 5.8 percent.

But while I am not sanguine about the efficacy of these policy changes, there is some reason to hope that the problem, instead of intensifying in the future, as some believe, might diminish to some extent. In the first place, continuation of the growth of foreign competition should increase the inclination and the ability of American employers to resist union demands—provided, however, that Congress and the Administration resist their pleas for greater protection. In the second place, some of the best-organized sectors of the nonfarm labor force—notably production labor in manufacturing and mining—have been shrinking relative to the total labor force; and, to date at any rate, the unorganized frontiers have presented formidable obstacles to unionism.

Finally, unions and management themselves have been developing some institutions which, while increasing costs, might be less inflationary than equivalent straight-wage increases. Increases in private pension funds

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fall into this category. Provision for severance pay (which has been gaining popularity greatly in recent years) and other financial provisions for employees displaced by technological change are a desirable alternative to immobilizing makework rules and probably outweigh any tendency which they might have to discourage innovation in the first place. Even cost-of-living escalator clauses may be placed in this category. To the extent that they permit wage increases generally to respond more promptly to price increases, they prove more inflationary than

negotiated wage increases.⁶ But, by making it unnecessary for unionists to attempt to discount anticipated price increases or to "make up" for past price increases in current wage settlements, they tend to rule out a self-defeating process which could generate successively greater wage and price increases. Thus, even if the escalators have contributed to the inflationary creep, they might also help to prevent it from breaking into a gallop.

⁶ Benson Soffer, "The Effects of Recent Long-Term Wage Agreements on General Wage Level Movements," *Quarterly Journal of Economics*, vol. LXXIII, February 1959, pp. 36-60.

In backward ages, universities keep alive philosophy, and in progressive ages, they lead the forward movement . . . they bring a portion of each successive generation to the confines of knowledge, to the very edge of territory already conquered, and say . . . "Thus far came our fathers. Now press you on!"

Charles W. Eliot

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A Groundrule for Foreign Business Operations: Don't Put All Your Eggs in One Basket!

GERHARD G. MUELLER

A single business transaction or operation in one foreign country is not a good test of the foreign-operations potential of your company. Indeed, it may be a one-way ticket to trouble. This article will tell you why.

A U. S. firm about to enter into operations in a foreign country is likely to encounter some seemingly insurmountable hurdles. Tariffs or import quotas are too restrictive, profits can't be remitted freely, foreign exchange rates are subject to unpredictable fluctuations, or transportation costs are prohibitive. These and other hurdles are indeed high, but they are not insurmountable. Many of the problems that emerge when looking at a single transaction in a single country find ready solutions if placed in a context of diversified foreign operations.

In present-day domestic business practice in the United States, the advantages of diversity are recognized almost universally. Firms constantly seek new consumer markets which differ in geographical location or in personal-income strata represented thereby. Product diversification is pursued, and the decentralization of management authority has become an important trend on the administrative scene. In a cumulative way, diversity, so the argument goes, leads to a better utilization of resources. It also helps in making quicker and more informed business decisions, and from an over-all standpoint, it may contribute toward achieving a relatively even stream of profits in the future.

Yet the arguments for diversification are not often applied to the field of foreign operations. It is the purpose of this article to show how and why diversity is even more important in the international field than it is at home.

The Risk Factor in Foreign Exchange

Financial aspects are often the most intricate part of business transactions in or with foreign countries and thus merit foremost attention. It will be maintained here that the risk factor associated with the use of foreign exchange varies inversely with the number of unrelated foreign currencies actively utilized. Furthermore, a willingness to deal in a variety of foreign exchange should broaden the scope of possible foreign operations materially.

Foreign exchange is a commodity, commanding both a market and a price. Most governmental units control their respective currency markets, either by direct regulation or by price fixing. Hence the currency of each country is a separate economic good. Some foreign exchanges are closely related (e.g. the various Sterling currencies), while others with an apparent relationship have in fact little in common (e.g. the Deutsche Mark of Western Germany vs. the Deutsche Mark of Eastern Germany). Unrelated foreign currencies have a distinct and separate existence. This latter category is the one which is of primary concern in this discussion.

I asserted above that certain benefits derive from using different foreign currencies wherever possible in the over-all scheme of foreign operations. For one thing, the risk arising from unexpected value changes of any one currency is distributed among a number of possible sources. Moreover, some

deliberately initiated courses of action to avoid devaluation loss become feasible.

Hedging Against Devaluation

The practice of hedging can be employed. This involves a certain "balancing" of short-term receivables and payables in a given foreign currency. An actual case may serve to illustrate. A large U. S. manufacturer bought repeatedly substantial quantities of industrial chemicals from a supplier in Western Germany. The U. S. firm also operated a wholly-owned subsidiary in Mexico. On the company books was a significant receivable from the subsidiary, the amount of which was to be paid in Mexican pesos. Officers of the firm expected a devaluation of the Mexican currency, and some hedging was employed. Inquiry established that the German supplier was willing to accept his ninety-day drafts (payment for the chemicals) in Mexican peso currency. Apparently he was able to make an agreement with still another German firm which had certain peso liabilities. Thus the U. S. firm had "protected" the peso receivables from its Mexican subsidiary. A devaluation would have left the firm's current asset position substantially unchanged. Likewise, the German firm was able to hedge against a possible devaluation loss.

Hedging in a unilateral situation involves the purchase of so-called "forward" funds, which is usually quite expensive in the face of unstable exchange values. If the hedging can be done within the firm's own foreign operations, the payment of heavy premiums in the forward exchange market can be avoided.

Utilization of "Blocked" Currencies

Where operations are spread to more than one foreign country, it is often easier to overcome temporary difficulties with any one foreign currency. Suppose it develops that funds can be withdrawn from a given foreign area only at extremely unfavorable rates (for example, as the result of a change in a multi-rate system). Instead of leaving such funds

idle for the time being, the company may find use for them in other foreign business operations. One company reports that it found itself in the circumstances described and came up with a solution: it transferred various translation and printing jobs to the country concerned and was soon able to use the stagnant funds to good advantage.

While such "safety valves" are not always available upon first glance, they do have a habit of emerging after some search. For example, sometimes airline tickets or other international transportation charges can be paid for with funds difficult to use elsewhere. The same holds true for some insurance charges. Many U. S. firms pay for the international business-travel expenses of their employees entirely through use of foreign currency funds. So a few means exist whereby even blocked or "soft" currencies can render value to a network of foreign enterprises.

Shifting Funds to Gain Dollars

Another aspect of separated foreign business endeavors pertains to the remission of dividends, fees, royalties, etc. Unless remitted amounts are in U. S. dollars, they have no usefulness to the parent organization. Since dollar availability abroad is very much limited, many complex problems may arise. This single fact is probably the most important chapter in the book of U. S. foreign business operations. Here we can be concerned with only one of its many facets.

At times it is possible to shift the incident of dollar payments from abroad from one country to another one. The resulting effect may accomplish the conversion of foreign funds into dollars at more advantageous rates or permit remission of some funds otherwise unavailable for use in the United States.

If foreign exchange markets were completely unrestricted the world over, arbitrage would eliminate differences in exchange rates as they apply to individual currencies. In reality, we are far removed from this ideal. Many bilateral trading agreements are in force today which settle international trade

accounts in terms of "agreement rates." Also, a number of countries adhere to multiple exchange rates. In this case, the nature of specific payment items determines the rate which will be applied. Therefore, by shifting the origin of a foreign payment, a dollar gain may be realized.

Let me illustrate with a hypothetical example. Company X has a foreign subsidiary in country A, which employs a multiple rate structure in a controlled foreign-exchange market. With express permission from country A's government, the subsidiary accrues management fees and interest on a loan. These accruals can be converted into dollars at a rate of ten to one. At the same time, country A requires essential imports from country B and grants a rate of seven-to-one in payment for such imports. Exports from A to B, aligned to import needs, command an eight-to-one exchange rate. The currency of country B has a one-to-one value in exchange with the dollar. Country B's currency is convertible and the subsidiary of company X produces goods for export to country B. Shifting the payment of fees and interest to country B will result in a dollar gain.

While the illustration may seem very confusing, it conveys a feeling for the multiplicity often needed in situations pertaining to foreign payments. Still, once the applicable facts are known, the arithmetic becomes quite simple. Assume C_a to be country A's currency, C_b to be the currency of country B. The foreign subsidiary accrued C_a \$200,000 payable to the parent company. Payment can be made as follows:

(a) *Directly.*

The C_a \$200,000 are converted at a rate of ten-to-one and furnish to the parent company U. S. \$20,000.

(b) *Via country B.*

Goods valued C_a \$200,000 are exported to country B. A receivable of C_b \$25,000 is created. This receivable is used to liquidate the dollar obligation

and the parent company receives U. S. \$25,000.

Exchange control authorities in country A permitted alternative (b) because receipts from exports were used to pay dollar obligations.

A similar case can be made concerning remission of otherwise restricted funds. Some countries, even though their currencies are convertible, may feel a need to "protect" themselves from large U. S. imports through the use of quotas and tariffs. However, as a result of closer trade relationships, their quotas and tariff schedules against other countries may be less severe. Hence, a subsidiary operating in a restricted-currency country may have an opportunity to sell part of its output in the country whose currency is convertible. This may have to be achieved indirectly by using third-country intermediaries, making prices extraordinarily attractive, or obtaining small quantities of raw materials from the country in which the sales are sought. In this fashion, any net balances of convertible currencies are utilized to remit funds to the United States. Again the burden of remitting dollar funds is being shifted from one country to another one.

Shifting funds between foreign countries does not yield any benefits unless at least one of the currencies involved is convertible. Present evidence indicates that actually a large number of foreign currencies are convertible for current-account transaction (i.e., when not used for long term capital movements).¹ Incidentally, the so-called "balance of trade" should not be used as an indicator

¹ Since December 1958, quite a few countries have announced the convertibility of their respective currencies. Convertibility as used here means the free general exchange of nonresident current earnings into any foreign (non-resident) currency at rates within the official margins. "Nonresident" connotes not only outside the country concerned but also outside any monetary area to which it may belong. The countries are: Australia, Austria, Belgium, Burma, Ceylon, Denmark, Finland, France, Federal Republic of Western Germany, India, Iraq, Ireland, Italy, Jordan, Libya, Luxembourg, Malaya, Morocco, Netherlands, New Zealand, Norway, Pakistan, Portugal, Sudan, Sweden, Tunisia, Union of South Africa, and United Kingdom.

Source: *Tenth Annual Report on Exchange Restrictions*, International Monetary Fund, Washington D.C., June 1959.

of convertibility prospects, present or future, since non-trade items (e.g., tourist expenditures, gold flow, capital movements, etc.) often materially influence the balance of payments of a country under consideration. The balance of payments (the aggregate of all foreign-exchange dealings) determines the extent of any foreign-exchange problem and must be used in analyzing the financial affairs of operating in foreign countries.

The Tax-Saver Corporation

The concept of tax-saver corporations has provoked much comment in recent years; therefore, brief mention of its advantages is in order. A tax-saver corporation is a foreign-subsidary company incorporated in a country which either does not tax corporate income at all or does not tax corporate income earned in other foreign countries. When a subsidiary company in a "tax-haven" country becomes the holding company for other foreign subsidiaries, the tax-saver corporation is established. However, before U. S. income tax benefits are achieved, the U. S. Internal Revenue Service must be fully convinced that the tax-saver corporation transacts *bona fide* business and is not merely a tax-evasion scheme.

From the multidimensional foreign-operations point of view, the main advantage of a *bona fide* tax-saver corporation lies in the fact that foreign-earned income can be accumulated or reinvested in other foreign countries without payment of U. S. corporate income tax. This holds true as long as none of the foreign income accumulated by the tax-saver corporation is remitted to the United States proper. Thus, sizable funds could be gathered potentially without incurring a U. S. tax liability. These funds could constitute a formidable competitive weapon, since they would make possible new foreign investments at greater risks, could be used to finance exports from the United States, and allow greater credit extension at higher credit risk. Many U. S. corporations do have tax-saver foreign subsidiary companies, but

the legal and tax status of such subsidiaries is still very much indeterminate. Until some further Treasury Regulations and legal cases become available, a more complete evaluation is impossible.

Effects of Administrative Diversity

Having explored a number of financial advantages which might accrue from diversity in foreign operations, I now turn to a consideration of a few administrative effects. This is the area in which foreign and domestic practices are most akin and furnish similar cause-and-effect chains. All arguments made for diversification and decentralization domestically apply with equal force to the foreign field. Over-all long-range profitability has a better chance of success if a number of countries and a number of products can be involved in operating abroad. And there is nothing mysterious about operating beyond national borders, although many a person active in foreign business affairs tries to be convincing to the contrary.

Yet it must be remembered that standards of performance, including demands on human efficiency, are appreciably different in most foreign countries. The standards correspond more closely between foreign areas of given regions than between any foreign country and the United States. From this position it will be argued that comparisons between some foreign units are valid, whereas an alignment against U. S. standards would be meaningless. Of course one cannot compare unless two or more items comprise a given universe. So the administrative task of evaluation can be performed more effectively where more than one operation is present in the foreign field. Once the process has been started, it will also be easier to deal with entirely new situations in operating abroad. Certain concepts and patterns will have been established from which a transfer value results.

Reports from management conferences indicate that the majority of U. S. firms with international affiliates allow large measures

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of local autonomy and seek to employ nationals of the country in which the respective operation is located. Hence with units operating at various points on the international scene, and with employees who understand and are familiar with each local condition, a firm is in a strong position to become significantly aware of opportunities. Small changes of product, advertising technique, or what not, may have benefits for the entire foreign program. Many cases are known where business activity in only one foreign country produced barely acceptable results; as soon as several other ventures were added, coordination and new information furnished the basis for very successful administration.

A further assertion rests on the fact that management of foreign operations is a highly specialized function. No matter how decentralized the organization is, it needs a top-level domestic group along with a competent specialized staff to direct the over-all international business. Small and unprofitable segments of a firm cannot support nor attract high-quality management personnel. A company simply cannot hire a foreign exchange specialist for one foreign subsidiary plus some export orders. And to rely on consultants is often too expensive on a continuous basis or too sporadic to be of real value. The implication should be clear: the writer conceives of foreign operations in a long-term sense, something which merits genuine business efforts, and therefore something to which the best available tenets of management should be applied.

Benefits of Production Diversity

Let us now consider briefly the production (i.e., manufacturing/assembling) aspects of locating plant operations abroad. One could pursue this topic from an approach via benevolent elements—helping other countries to industrialize, training foreign nationals in a multitude of skills, or sharing our industrial know-how and experience. No doubt we could thus make our case honestly. But our primary motive is usually the achievement of

profits; in an ultimate sense, profits are always our point of departure. The question at hand must be dealt with correspondingly.

The benefits of spreading industrial enterprise to different countries have been expounded for centuries. Differential resources can be used to the advantage of all concerned, whether the advantage is absolute or relative. Theoretically this has been explained in terms of comparative advantage, price differences and price structures, and more recently in terms of economic opportunity costs. Some countries can supply special skills at low costs, others have particular raw material resources, and still others may have special advantages in the way of banking facilities, transportation facilities, or various tax concessions. So by operating in a number of foreign countries, certain optimum production conditions which otherwise would not be possible usually can be accomplished.

There is also a psychological value to be gained from both manufacturing and selling in any one foreign country. It matters little if a final product is entirely or only partly produced in the country in which it is to be sold, as long as some productive activity can be directly related to it. Strong feelings of nationalism plus clamor for home industries abroad have made "making-selling" combinations almost essential in various foreign countries. Where such combinations can be used, the following results are not unusual: (a) better product acceptance, (b) better market potentials along with better profit margins on selling price, and (c) some protection by the foreign country as a "native" industry.

You have already seen that producing and selling in a number of foreign countries can provide, depending upon the circumstances, some opportunity for financial hedging and shifting of funds. Now I would like to add that diverse operations also can be a means of obtaining some relief from import restrictions in general. If motors are produced in country S, belts in country Y, and steel

frames in country Z, it almost certainly will be easier to obtain import licenses for conveyors into all three countries than if one country produced the entire output and tried to sell to the other two as well. Individual situations vary greatly in this regard, and frequently a production coordination center is needed to ensure best usage of all facilities.

Exchange of production information often is stressed as a beneficial result of operating plants at different international locations. One company reports that adaptation of certain products to foreign markets induced valuable product improvements for the domestic line. It has also been reported that at times the foreign engineers take completely different approaches to some production problems and come up with ideas useful at home and abroad. Such incidents may not be plentiful. Still, they help to illustrate that, ever so often, practical new modes of thinking gained in different environments lead to the use of better materials or methods.

Finally, a word of caution. The availability of "cheaper" labor abroad is all too often cited as the main advantage of producing in

a foreign country. This is not as true as is generally assumed. Many times it has been found that the "cheaper" labor is really not so cheap after all, once allowances for productivity are made. Many facets of a foreign-operations problem must be carefully investigated and researched before valid conclusions can be reached.²

I have demonstrated why the complex of foreign operations should be conceived broadly and as a network of many interrelations and diverse forces. Narrow, unilateral approaches can be as harmful abroad as they can be at home. Greater business risks must be taken when a company steps outside its own national boundaries, but the possibility of compensating rewards exists. The most elegant witness to this fact is the unprecedented recent increase of private U. S. foreign investment. As we learn more about working with foreign resources, we stand to gain much, and to mutual advantage, if we replace our timid historical perspectives with some vigorous forward orientation.

² Elwood S. Buffa and Alexander E. Bogardy, "When Should a Company Manufacture Abroad?" *California Management Review*, Winter, 1960.

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The Role of the Assistant: A Modern Business Enigma

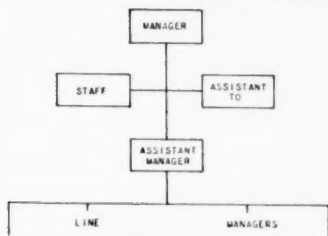
CYRIL O'DONNELL

If you are having problems defining the duties of your assistants, this article will show you a logical differentiation between the staff, line assistant, and assistant-to.

The indiscriminate and often non-logical use of the term "assistant" in modern business had lead to confusion over the functions and authority that accompany the title. Assuming that such confusion is unnecessary and can waste money and manpower, I have sought to analyze the specific purposes for, and to suggest a logical differentiation between, the various types of assistants.

This study will focus on three assistant positions vital to the management structure of a company: the assistant manager, the staff assistant, and the assistant to the manager. These personnel are normally shown on an organization chart as illustrated in Figure I.

FIGURE I
TYPICAL ORGANIZATION STRUCTURE SHOWING
RELATIONSHIPS BETWEEN A MANAGER, HIS
STAFF, ASSISTANTS AND LINE SUBORDINATES



The Manager's Staff

The fundamental distinction between staff and line is one of authority relationships.¹ Line managers are in the direct chain of command and exercise their delegated au-

thority to carry out assigned functions and make the decisions required in the process. Staff, on the other hand, is delegated the authority to investigate, report, and advise their superior.²

Line managers frequently find themselves in a position where they lack either the time or the special skill required to develop all the facts concerning a management issue. For instance, they may require information and recommendations concerning markets, the control system, budgeting, or procedures. Lacking the time or skill required for these projects, they may seek outside assistance from consultants if the assignment is of a short-term nature, or they may employ a full-time specialist in any or all of the areas in question. If the latter decision is made, a staff of one or more persons, each expert in a given area, is created with the authority to advise his superior. As the number of staff experts increases, it soon becomes economical in terms of recruiting, supervision, planning, and coordination to select a chief to manage the staff.³

At this point, it may be noted that *all* managers, including line, service and staff, act in a staff capacity when so requested by their superiors. Thus, a manufacturing execu-

² In addition, staff sometimes is delegated functional authority, an important and often disturbing development which is discussed below.

³ It will be noted that this concept of staff *excludes* the service departments such as accounting, plant maintenance and personnel. These groups have line authority and exist to serve all other managers and are separately organized for purposes of economy. See H. Koontz and C. O'Donnell (see note 1), chap. 10.

¹ H. Koontz and C. O'Donnell, *Principles of Management* (2nd ed., New York: McGraw-Hill Book Co., 1959), chap. 9.

tive may be asked to advise his chief concerning space or equipment; a sales manager may give advice about a new market or product. These men are acting in a staff capacity *only* when giving advice. Most of their time is spent in carrying out their line functions, and they are, for this reason, called line executives. The "pure" staff personnel spend *all* their time investigating and advising and, consequently, are properly denoted by their title.

The wide variety of adjectival descriptions being applied to staff positions adds further to organizational confusion. Businessmen have been unusually prolific in contributing to this fund of descriptive titles, probably to clarify in their own minds just what the term "staff" means. Anderson mentions "staff assistant," "assistant-to," "administrative assistant," "special assistant," "executive assistant," and "full assistant,"—a thorough muddying of the waters.⁴ Urwick, drawing exclusively on military practice, writes of "general staff" and "special staff."⁵ And in business enterprises, we also find the use of the terms "administrative staff" and "technical staff." It is doubtful that the wide variety of adjectives adds anything to the use and understanding of the purpose and authority of staff. When the staff is so large that it is desirable to departmentize functions, it is then convenient to subtitle each group to permit easy identification. This device, which has long been employed by large-scale enterprises, is illustrated in Figure II.

Functional Authority of Staff

In large-scale enterprises it is sometimes convenient to delegate to one manager specific authority over a process undertaken by other managers. For instance, it is common practice to delegate to an industrial-relations manager the authority to interpret the union contract for all managers; a manufacturing executive may be delegated the

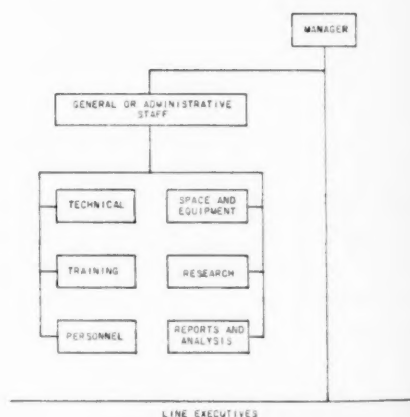
authority to require that men subordinate to the sales executive conform to a specific procedure in installing equipment; and a comptroller may have specific authority over the way in which information is reported by a cost accountant subordinate to a manufacturing manager. In like fashion, a staff manager may be delegated the restricted authority to require salesmen to follow a given procedure in reporting information from the field. In all of these instances we find line, service, and staff managers exercising functional authority. While the wisdom of this practice is not being considered here, it is important to recognize that the authority to advise is the one exercised by all staffs and that any functional authority delegated to a staff is additional.

A decision to create a staff, then, should depend upon the time and skill limitations of the line managers. If these limitations are restrictive, there is a sound basis for creating a staff despite its cost in dollars and in potential organizational confusion.

The Line Assistant

The line assistant is a true line manager and, consequently, is in the direct chain of command between the superior and his subordinates. He is known by such titles as "assistant manager," "deputy manager" and "executive vice-president." Furthermore,

FIGURE II
ORGANIZATION OF DEPARTMENTIZED STAFF



⁴ R. C. Anderson, "The Assistant—Idle or Vital," *Business Horizons*, vol. 2, no. 1 (Spring, 1959).

⁵ L. F. Urwick, *Notes on the Theory of Organization* (New York: American Management Association, 1952), pp. 67-74.

⁶ R. C. Anderson, "The Assistant—Idle or Vital," *Business Horizons* (Spring, 1959).

there is only one position of this type; if there were more, the result would be the familiar process of departmentation.

The position of assistant manager is created in order to provide the superior with general help to manage a department or division or to aid a president to manage a firm. Hence, it is commonly said that an assistant manager is required when an activity is too large for one man (the superior) to manage. Despite the widespread use of this type of assistant, there are those who assert that the cure for enterprises or activities too large for one man to manage is to split them into smaller units so that their managers would not require line assistants.⁶

The problem of cleanly delineating the functions of an assistant manager is complex. One view is that the superior, in addition to his own relationships with peers and superiors, manages his assistant, and the latter manages his own subordinates. Since this concept implies a span of management of one, it is certain that the superior manager would be considerably underemployed and in grave danger of becoming totally unemployed. As a consequence, some basis for dividing the management functions between the superior and his assistant is normally sought. The most successful division occurs when the assistant is made responsible for the day-to-day activities of the operation and the superior concerns himself with longer-range functions. In this conception, the superior retains planning, organization, control design, and staffing, while his assistant employs the control devices in carrying out the direction function. This is a logical division which permits the superior to concentrate on the broader and more fundamental issues while his assistant keeps in close touch with operations and is always available to his subordinates.

There is, in addition, a third conception of the relationship between a superior and his assistant. In this view, the latter is con-

sidered the *alter ego* of the former, and carries out all of the managerial functions in the absence of the superior. For instance, firms which are heavily committed on government contracts experience a need for their managers to travel up to as much as half their time. This requirement is often divided between the manager and his assistant. Travel schedules are developed in such a way that either one is always on hand to carry out the full functions of a manager. The *alter ego* concept is workable so long as both managers know each other so well that they would make the same decisions in a given set of circumstances. On the occasions when both are present, there is a tendency for the assistant to revert to the direction of day-to-day operations.

The position of line assistant is much better understood in enterprise than that of any other type of assistant. The difficulties which are inherent in this organizational device involve the division of managerial functions. Great care needs to be taken to make certain that subordinates do not whipsaw the assistant by going directly to the superior when unfavorable decisions are made. The obvious need for unity of thinking and action on the part of the manager and his line assistant requires both understanding and strength of character. The lack of these qualities inevitably makes the position of assistant manager unenviable and suggests that this organizational device be used, if at all, as a last resort.

The Assistant-to

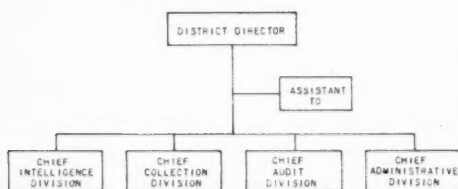
As in the case of other types of assistants, the functions of assistants-to vary from those of a messenger to a powerful aide. Oftentimes it is merely a title conferred on a person whom a manager wishes to introduce into the firm without immediately changing the line structure. Such uses always introduce confusions in enterprise relationships, and for this reason, it would be much better to assign the functions in question to line personnel or to an appropriate staff group.

⁶ R. J. Cordiner, *New Frontiers for Professional Managers* (New York: McGraw-Hill Publishing Co., Inc., 1956), p. 70.

But there is a use for the assistant-to title to describe the temporary position of trainee for line management. Such a person has had a successful history of accomplishment in previous assignments, and he has been identified as a man with marked managerial potential. The barrier to immediate promotion lies in his narrow experience. For such a person, the trainee position of "assistant-to" is specially created.

The assistant-to position provides an opportunity for broadly training a man without burdening him with management responsibility. The candidate will normally rise through the management levels of a department, and as such, his experience is likely to be highly restricted. If he is destined for further promotion he will require broader experience. One method of developing such a person is to assign him the position of assistant to his superior. For instance, Figure III represents, in abbreviated form, the typical district organization of the Internal Revenue Service. The problem before us is to develop candidates for district directors.

FIGURE III
TRAINING OPTIONS FOR
PROMOTABLE MANAGERS



Normal succession would be accomplished by selecting candidates from among the division chiefs. However, these officers have risen through the ranks of *their own divisions* and, consequently, possess a very narrow background. They may be too high in the organization structure to exchange positions with each other.⁷ The drawbacks to

⁷ To avoid this limitation, rotation at lower levels and early in the career of these managers is always desirable where possible. But the practical manager will recognize many situations requiring hard-to-come-by technical knowledge which often limits the practice.

such a practice include insufficient technical knowledge for divisional operation, only one may be a candidate, and the efficiency of affected divisions may be imperiled. A convenient solution is to create a position of assistant to the director, and assign the candidate to it.⁸

It is the responsibility of the superior to develop a program which will effectively broaden the experience of the trainee. Such a program is normally comprised of specific assignments for investigation of management issues affecting all subordinate divisions, attendance at staff and other meetings, and coaching on the part of the superior. For instance, the assistant-to may be assigned the task of investigating and making a recommendation to improve an inter-divisional procedure. This assignment will require a close study of divisional operations, the evaluation of proposals with affected personnel, and a management recommendation. Subsequent assignments are selected in a way to develop a broad and considerable knowledge of the total operation. As the experience of the trainee expands and deepens, the value of his studies would be expected to improve and may result in important benefits to the operation. Indeed, it may be said that if this result is not obtained, the trainee would be a failure as a candidate.

Although the assistant-to has been called a man in motley,⁹ due, in my opinion, to the improper use of the position, there is no reason why this vague conception should remain. If the position is specially created for the specific purpose indicated above (and abolished when no longer required) it can serve very efficiently in the development of managers.

⁸ There are others. For instance, the qualified candidates may be rotated through the director's position in his absence. The chief drawbacks are: (a) the time spent in the position may be too limited to provide broad experience; and (b) the candidate may make no decisions for fear of making an error, or he may make many decisions, feeling that he will not be held responsible for results.

⁹ T. L. Whisler, "The Assistant-to: The Man in Motley," *The Journal of Business*, vol. 29, no. 4 (October 1956).

The conditions for the successful employment of this organizational device are clarity of purpose, operation-wide assignments, and coaching skill. The last condition is especially important. Not all superiors (we may say not many) are skilled teachers. They often begrudge the time, are careless in making assignments, and fail to secure the cooperation of their subordinates. On the other hand, those who are genuinely interested in developing the managerial potential of the assistant-to will approach the issue with skill and sympathy.

Summary

The staff, line assistant, and assistant-to are as different from each other in conception as are the divisions of an enterprise. The proper use of these positions improves organizational flexibility and meets the manager's requirements for special types of service. The appropriate assignment of functions and authority in each case will overcome the more common frustrations with these devices and make it quite unnecessary for managers to invent obscure, adjectival descriptions for recognized staff positions.

Our whole scheme of organization depends for its success on getting the job defined, and (on placing) the responsibility for a decision just as close to the scene of operations as possible.

L. C. Goad
Executive Vice President
General Motors

Can Business Afford To Ignore Social Responsibilities?

KEITH DAVIS¹

When you make business decisions that involve social responsibilities, you should keep in mind the three basic ground rules presented here.

Few persons would deny that there are significant changes taking place in social, political, economic, and other aspects of modern culture. Some of these changes businessmen may want and others they may dislike, but in either instance the changes do exist and must be faced. As our culture changes, it is appropriate—even mandatory—that businessmen re-examine their role and the functions of business in society. One area undergoing extensive re-examination is the responsibility businessmen have to society in making business decisions.² These are the questions that are being asked:

Why do businessmen have social responsibilities, if in fact they do?

How does a businessman know in what directions his social responsibilities lie?

If businessmen fail to accept social responsibilities incumbent upon them, what consequences may be expected?

¹ For sharpening some of the ideas herein the author wishes to thank members of the UCLA Summer Executive Program, where he served as conference leader of sessions on "The Social Responsibility of Business" in 1958 and 1959; however, the author takes full responsibility for the ideas presented in this article.

² For excellent examples of current literature see Howard R. Bowen, *Social Responsibilities of the Businessman* (New York: Harper and Brothers, 1953); Edward C. Bursk, Ed., *Business and Religion* (New York: Harper and Brothers, 1959); Ralph J. Cordiner, *New Frontiers for Professional Managers* (New York: McGraw-Hill Book Company, 1956); Crawford H. Greenewalt, *The Uncommon Man* (New York: McGraw-Hill Book Company, 1959); Theodore V. Houser, *Big Business and Human Values* (New York: McGraw-Hill Book Company, 1957); Clarence B. Randall, *A Creed for Free Enterprise* (Boston: Little, Brown, and Company, 1952); Benjamin M. Selekmán, *A Moral Philosophy for Business* (New York: McGraw-Hill Book Company, 1959); Chester I. Barnard, "Elementary Conditions of Business Morals," *California Management Review*, Fall, 1958, pp. 1-13; and O. A. Ohmann, "'Skyhooks' with Special Implications for Monday through Friday," *Harvard Business Review*, May-June, 1955, pp. 33-41.

It is my purpose in this article to discuss these questions in a very fundamental way. Without looking at specific company practices and without insisting upon a particular program of action, I wish to discuss three basic ideas which must underlie all of our thinking about social responsibility, regardless of what choices we eventually make. The first two ideas are constant and enduring, no matter what social changes occur. The third is more directly related to social changes today, but I believe it is just as fundamental as the others.

Social responsibility is a nebulous idea and, hence, is defined in various ways. It is used here within a management context to refer to *businessmen's decisions and actions taken for reasons at least partially beyond the firm's direct economic or technical interest.*³ Thus, social responsibility has two rather different faces. On the one hand, businessmen recognize that since they are managing an economic unit in society, they have a broad obligation to the community with regard to economic developments affecting the public welfare (such as full employment, inflation, and maintenance of competition). A quite different type of social responsibility is, on the other hand, a businessman's obligation to nurture and develop human values (such

³ Some socially responsible business decisions by a long, complicated process of reasoning can be "justified" as having a good chance of bringing long-run economic gain to the firm and thus paying it back for its socially responsible outlook. This long-run economic gain is often merely rationalization of decisions made for non-economic reasons, and in any case the connection is so problematical that some social responsibility is bound to be present also. An example is a decision to retain a very old employee even though his productivity is low.

as morale, cooperation, motivation, and self-realization in work). These human values cannot be measured on an economic value scale. Accordingly, the term "social responsibility" refers to both socio-economic and socio-human obligations to others. Popular usage often omits or underplays the socio-human side, but I shall suggest later in this article that it deserves more emphasis.

Note that the importance of social responsibility in this context derives from the fact that it affects a businessman's decisions and consequently his actions toward others. Social responsibility has applied in any situation if it *influences* a businessman's decision even partially. It is not necessary that a decision be based wholly on one's attitude of social responsibility in order to qualify. For example, when a businessman decides to raise or lower prices, he is normally making an economic decision; but if the management of a leading automobile firm decided not to raise prices because of possible effects on inflation, social responsibility would be involved. As a matter of fact, *rarely* would social responsibility be the exclusive reason for a decision.

While it is true that only businessmen (rather than businesses *per se*) make socially responsible decisions, they decide in terms of the objectives and policies of their business institution, which over a period of time acquires social power in its own right. Thus each business institution and the entire business system eventually come to stand for certain socially responsible beliefs and actions. But in the last analysis it is always the businessman who makes the decision. The business institution can only give him a cultural framework, policy guidance, and a special interest.

Responsibility Goes With Power

Most persons agree that businessmen today have considerable social power. Their counsel is sought by government and community. What they say and do influences their community. This type of influence is

social power. It comes to businessmen because they are leaders, are intelligent men of affairs, and speak for the important institution we call business. They speak for free enterprise, for or against right-to-work policies, for or against their local school bond election, and so on, *in their roles as businessmen*. When they speak and act as citizens only, and those involved recognize this fact, then whatever social power businessmen possess is that of a citizen and is beyond the bounds of this discussion. In practice, however, it is often difficult to distinguish between these two roles, thereby further complicating the situation.

To the extent that businessmen or any other group have social power, the lessons of history suggest that their social responsibility should be equated with it. Stated in the form of a general relationship, it can be said that *social responsibilities of businessmen need to be commensurate with their social power*. Though this idea is deceptively simple on its face, it is in reality rather complicated and is often overlooked by discussants of social responsibility. On the one hand, it is argued that business is business and anything which smacks of social responsibility is out of bounds (i.e., keep the power but accept no responsibility). On the other, some would have business assume responsibilities as sort of a social godfather, looking after widows, orphans, water conservation, or any other social need, simply because business has large economic resources. Both positions are equally false.

The idea that responsibility and power go hand in hand appears to be as old as civilization itself. Wherever one looks in ancient and medieval history—Palestine, Rome, Britain—men were concerned with balancing power and responsibility. Men, being something less than perfect, have often failed to achieve this balance, but they have generally sought it as a necessary antecedent to justice. This idea appears to have its origins in logic. It is essentially a matter of balancing one side of an equation with the other.

The idea of co-equal power and responsibility is no stranger to business either. For example, one of the tenets of scientific management is that authority and responsibility should be balanced in such a way that each employee and manager is made responsible to the extent of his authority, and vice versa.⁴ Although this tenet refers to relationships *within* the firm, it seems that it would apply as well to the larger society outside the firm. As a matter of fact, businessmen have been one of the strongest proponents of co-equal social power and responsibility, particularly in their references to labor unions.

Based upon the evidence, it appears that both business leaders and the public accept the idea of co-equal power and responsibility. Although businessmen accept the logic of this idea, their problem is learning to respect and apply it when making decisions. Granted that there are no pat answers, they still need some guides, else each shall take off in a different direction. At this point, the idea already stated continues to offer help. If "social responsibilities of businessmen need to be commensurate with their social power," then, in a general way, *in the specific operating areas* where there is power, responsibility should also reside. Let us take an example:

Company "A" is the only major employer in a small town. It is considering moving its entire plant out of the area. Company "B" is considering moving its plant of the same size out of a large city where it is one of many employers. It would seem that, other things being equal, Company "A" should give more weight to social responsibilities to the community when considering its move.

Even accepting the greater responsibility of Company "A", and some would not go this far, we still do not know how much greater nor in what way Company "A" should let its decision be amended, if at all. Thus the principle of co-equal power and responsibility

can at best serve only as a rough guide, but a real one. For example:

- Do businessmen by their industrial engineering decisions have the power to affect workers' feeling of accomplishment and self-fulfillment on the job? If so, there is roughly a co-equal responsibility.
- Do businessmen have power as businessmen to influence unemployment? To the extent that is so, is there not also social responsibility?
- Do businessmen have power to determine the honesty of advertising? To the degree that they do, is there also social responsibility?

One matter of significance is that the conditions causing power are both internal and external to the firm. In the example of advertising honesty, power is derived primarily internally from the authority structure of the firm and management's knowledge of product characteristics. In the case of Company "A" described earlier, much of its social power is derived from the external fact that it is the only employer in a small town. Each case is situational, requiring reappraisal of power-responsibility relationships each time a major decision is made.

There are, of course, other viewpoints concerning the extent of business social responsibility, and most of them offer a much easier path for businessmen than the one I have been describing. Levitt, in a powerful attack on social responsibility of businessmen, points out that if business assumes a large measure of social responsibility for employee welfare it will lead to a sort of neo-feudalism with all its paternalistic and autocratic ills. The result would be socially less desirable than in the days before businessmen were concerned with social responsibility.⁵ Selekmán, in an important new analysis, suggests that attention to social responsibility will undermine the main objective of all business, which is to provide

⁴ Harold Koontz and Cyril O'Donnell, *Principles of Management* (New York: McGraw-Hill Book Company, Second Edition, 1959), p. 95.

⁵ Theodore Levitt, "The Danger of Social Responsibility," *Harvard Business Review*, September-October, 1958, pp. 41-50.

economic goods and services to society.⁶ A collapse of business' basic economic objectives would indeed be a catastrophe. Certainly the primary economic objectives of business must come first, else business will lose its reason for existence. Selekmán's solution is a form of constitutionalism in which the responsibility of the business, other than its economic goals, is to administer its affairs with justice according to a constitutional framework mutually established by all groups involved. These criticisms and others raise questions about putting much social responsibility into business' kit of tools, a fact which leads directly to the second fundamental point of this discussion.

Less Responsibility Leads to Less Power

Certainly, if social responsibilities could be avoided or kept to insignificant size in the total scheme of business, a weighty, difficult burden would be raised from businessmen's shoulders. Business progress would be a primrose path compared to the path of thorns which responsibilities entail. But what are the consequences of responsibility avoidance? If power and responsibility are to be relatively equal, *then the avoidance of social responsibility leads to gradual erosion of social power.* To the extent that businessmen do not accept social-responsibility opportunities as they arise, other groups will step in to assume these responsibilities. Historically, government and labor have been most active in the role of diluting business power, and probably they will continue to be the principal challenging groups.⁷ I am not proposing that this *should* happen, but on basis of the

evidence it appears that this will tend to happen to the extent that businessmen do not keep their social responsibilities approximately equal with their social power. In this same vein Howard R. Bowen, in his study of business social responsibilities, concluded, "And it is becoming increasingly obvious that a freedom of choice and delegation of power such as businessmen exercise would hardly be permitted to continue without some assumption of social responsibility."⁸

Admiral Ben Moreell, Chairman of the Board, Jones and Laughlin Steel Corporation, put this idea more dramatically:

"I am convinced that unless we do [accept social responsibilities], the vacuum created by our unwillingness will be filled by those who would take us down the road to complete statism and inevitable moral and social collapse."⁹

History supports these viewpoints. Under the protection of common law, employers during the nineteenth century gave minor attention to worker safety. Early in the twentieth century, in the face of pressure from safety and workmen's compensation laws, employers genuinely accepted responsibility for safety. Since then there have been very few restrictions on business power in this area, because business in general has been acting responsibly. At the opposite extreme, business in the first quarter of this century remained callous about technological and market layoff. As a result, business lost some of its power to government, which administers unemployment compensation, and to unions, which restrict it by means of tight seniority clauses, supplemental unemployment benefits (SUB), and other means. *Now business finds itself in the position of paying unemployment costs it originally denied responsibility for, but having less control than when it did not pay!*

⁶ Benjamin M. Selekmán, *A Moral Philosophy for Business* (New York: McGraw-Hill Book Company, 1959), especially chapter 27.

⁷ For government's role, see George A. Steiner, *Government's Role in Economic Life* (New York: McGraw-Hill Book Company, 1953) and Wayne L. McNaughton and Joseph Lazar, *Industrial Relations and The Government* (New York: McGraw-Hill Book Company, 1954). For labor's role, see Neil W. Chamberlain, *Collective Bargaining* (New York: McGraw-Hill Book Company, 1951) and John A. Fitch, *Social Responsibilities of Organized Labor* (New York: Harper and Brothers, 1957).

⁸ Howard R. Bowen, *Social Responsibilities of the Businessman* (New York: Harper and Brothers, 1953), p. 4.

⁹ Admiral Ben Moreell, "The Role of American Business in Social Progress" (Indianapolis: Indiana State Chamber of Commerce, 1956), p. 20.

A current problem of social responsibility is gainful employment for older workers. The plight of workers in the over-45 age bracket is well known. In spite of public pronouncements of interest in them and in spite of their general employability, many of them find job opportunities quite limited or even nonexistent. I have said elsewhere that "unless management . . . makes reasonable provision for employing older persons out of work, laws will be passed prohibiting employment discrimination against older workers."¹⁰ Just as a glacier grinds slowly along, the responsibility-power equation gradually, but surely, finds its balance.

In line with the foregoing analysis, Levitt's proposal of "business for business' sake" loses some of its glamor, because it means substantial loss of business power. Historian Arnold J. Toynbee predicts this result when he speaks of business managers being part "of a new world civil service," not necessarily working for government, but working under such stability and elaborate rules both from within and without that they form a relatively powerless bureaucracy similar to the civil service.¹¹

It is unlikely that businessmen will concede their social power so easily, and I for one do not want them to do so. Businessmen are our most capable core of organization builders and innovators. We need them. In spite of pessimistic views, businessmen during the next fifty years probably will have substantial freedom of choice regarding what social responsibilities they will take and how far they will go. As current holders of social power, they can act responsibly to hold this power if they wish to do so. If their philosophy is positive (i.e., *for* something, rather than against almost any change) they can take the initiative as instruments of social change related to business. They will then be managers in the true sense of shaping the future, rather than plaintive victims of a

more restrictive environment. The choice is theirs.

Non-economic Values in Business

Early in this discussion I distinguished two types of social responsibilities. One was socio-economic responsibility for general economic welfare. The other was socio-human and referred to responsibility for preserving and developing human values. Let us now further discuss this distinction at it relates to a third idea underlying the entire problem of social responsibility.

There is general consensus that the "economic man" is dead if, indeed, he ever did exist. Men at work, as customers, and as citizens of a plant community do expect more than straight economic considerations in dealing with business. Since man is more than an economic automaton computing market values, what will be the role of business in serving his other needs? My third basic idea is that *continued vitality of business depends upon its vigorous acceptance of socio-human responsibilities along with socio-economic responsibilities*. A number of people accept the general idea of social responsibility, but they argue that business is wholly an economic institution and, therefore, its responsibilities are limited only to economic aspects of general public welfare. Following this line of reasoning, businessmen might be concerned with economic costs of unemployment, but not with the loss of human dignity and the social disorganization that accompany it. They would be concerned with making work productive in order to better serve society's economic needs but not with making it meaningful in a way that provided worker fulfillment.

The idea of confining social responsibility within economic limits fails on several counts. In the first place, it is hardly possible to separate economic aspects of life from its other values. Business deals with a *whole* man in a *whole* social structure, and all aspects of this situation are interrelated. It is agreed that the economic functions of busi-

¹⁰ Keith Davis, *Human Relations in Business* (New York: McGraw-Hill Book Company, 1957), p. 415.

¹¹ Arnold J. Toynbee, "Thinking Ahead," *Harvard Business Review*, September-October, 1958, p. 168.

ness are primary and the non-economic are secondary, but the non-economic do exist. Second, even if economic aspects of life could be wholly separated out, the general public does not seem to want business confined only to economics. They also have human expectations of business. Third, businessmen currently have socio-human power; hence, if they ignore responsibility in this area, they will be inviting further loss of power. On three counts, then, it appears unwise to equate social responsibility with economic public welfare.

As a matter of fact, it is not a question of "Will these non-economic values be admitted to the decision matrix?" but "To what extent will they be admitted?" Regardless of professions to the contrary, businessmen today are influenced by other than technical-economic values when making decisions. Businessmen are human like all the rest of us. They do have emotions and social value judgments. It is foolish to contend that they, like a machine and unlike other human beings, respond only to economic and technical data.

Businessmen in making decisions typically apply three separate value systems, along with overriding ethical-moral considerations. These are:

- Technical—Based upon physical facts and scientific logic.
- Economic—Based upon market values determined by consumers.
- Human—Based upon social-psychological needs other than economic consumption needs. This value system often goes by the term "human relations."

In many business decisions all three of these value systems exert some weight upon the final decision. Because man is human this aspect of his life cannot be ignored by any institution that deals with him.

But there are dangers in generalizations which are too sweeping, such as, "Business is responsible for human values in general." What is needed is a concept which marks business as an instrument for *specific human*

goals (along with technical-economic ones) in the life of man and his society—something which gives direction and hope to the climb of mankind from the depths of the Stone Age to the great potential which his Creator has given him. This kind of concept does not come easily but it must come eventually. By giving people motivation, social goals, and work fulfillment, business might over the long pull be termed a "movement" in the same way that history refers to the labor movement.

Certainly some major efforts at being explicit have been made recently. Theodore V. Houser, writing from the point of view of big business, stated five specific areas of social responsibility, ranging from employees to government.¹² Selekmán's idea of constitutional justice was discussed earlier.¹³ Crawford Greenewalt emphasized the importance of individual creativity and stated, "The important thing is that we bring into play the full potential of all men whatever their station."¹⁴ And there are many others. For my own use I have summed these ideas into a single manageable phrase, as follows: *To fulfill the human dignity, creativity, and potential of free men.*¹⁵ This can be businessmen's long-run guide to socially responsible action in each situation they face. The term "fulfill" is used because business cannot award goals such as human dignity. It can only develop the proper climate for their growth. The term "man" is used because unless *man* is free, men cannot be free. Other institutions and groups will also be interested in this goal. Businessmen are not wholly responsible here, but only partially so, approximately to the extent of their social power.

An Important Choice Ahead

The subject of social responsibility places business at an important crossroads in its

¹² Houser (see note 2), p. 2.

¹³ Selekmán (see note 2), p. 7.

¹⁴ Greenewalt (see note 2), p. 2.

¹⁵ One analyst has put this point even more strongly: "The making of goods is incidental and subordinate to the making of men," Raphael Demos, "Business and the Good Society," in Edward C. Bursk, Ed., *Business and Religion* (New York: Harper and Brothers, 1959), p. 190.

should be man

history. Which way it will go is not known, but in any event social responsibility will tend to equate with social power, which means that avoidance of responsibilities as they develop will lead to loss of business power. Some hard thinking is needed so that the right course can be charted. This is not the time for pat slogans, clichés, and wheezes. Clearly, economic functions of business are primary, but this does not negate the existence of non-economic functions and responsibilities. The price of social freedom is its responsible exercise.

Because society is changing, evidence suggests that the continued vigor of business depends upon its forthright acceptance of further socio-human responsibilities. In spite of protestations of impending corporate feudalism and dilution of economic objectives, the trend in this direction is already apparent. Some of the more fruitful avenues of interest are: making work meaningful,

developing persons to their fullest potential, preservation of creativity and freedom, and fulfillment of human dignity.

In summary, the *first* social responsibility of businessmen is to find workable solutions regarding the nature and extent of their own social responsibilities.

We can be confident that modern business leadership does have the capacity to deal with questions of social responsibility. Although the next fifty years will bring major social change, business should perform effectively in this instability because it is geared for change. Typically, during the last century it has had an unstable economic environment; yet it has learned to live and prosper therein. It can do the same during a period of social re-evaluation by developing flexible responses to the needs of society. But if it does not do so, it will use up its capital in human and spiritual values, which is a sure way to go socially bankrupt.

Advice is like snow; the softer it falls, the longer it dwells upon, and the deeper it sinks in the mind.

Samuel Coleridge

The Problem of Management Semantics

COL. LYNDALL F. URWICK

An illustrious British management expert criticizes the semantic bottleneck that inhibits a smooth flow of communications in business today.

More than 2400 years ago, the Chinese philosopher Confucius was talking with his disciple Tzu Lu:

"Sir," said Tzu Lu, "the Prince of Wei is waiting for you to assume the administration. What will you do first?" The Master Confucius said, "The essential thing is to rectify the use of terms." Tzu Lu said, "What, Sir! You are speaking off the point. What has such a rectification to do with government?" The Master said, "How unmannerly you are, Lu! When a man of breeding comes to anything he does not understand, he more or less blames himself. If names be not used correctly, then speech gets tied up in knots; and if speech be so, then business comes to a standstill."¹

That is the practical objection to a confused terminology . . . "business comes to a standstill." More recently a British scientist, Professor J. B. S. Haldane, made the same point from the academic angle—"Mechanics became a science when physicists had decided what they meant by such words as weight, velocity and force, *but not till then*."²

Students of management in other countries are profoundly grateful to the United States for the initiative, vigour and energy with which they have built up an apparatus for research and instruction in this new body of knowledge. To have created in half a century more than three-hundred faculties at major

universities devoted to a novel branch of learning represents an achievement in educational development which, as far as this writer is aware, is unparalleled in human history.

It is, however, a great handicap to the understanding of management ideas by nationals of other countries, especially perhaps those for whom English is a foreign language, that the terminology of the subject is still in such incoherent confusion. This may be due in part to the very enthusiasm with which educational facilities have been developed in the United States. Inky warfare is one of the occupational diseases of the academic life. And, like more serious forms of combat, it is prone to confuse rather than to clarify. Words become weapons of offence and defence rather than aids to communication.

As was written recently of the school of "linguistic" philosophy at Oxford . . . "Logically, of course, such philosophy should end by 'curing' itself and thus leaving its practitioners jobless; but in fact this danger seems remote. For in spite of their elaborate linguistic refinements, these philosophers have not yet achieved perfect clarity. While their despised predecessors from Hume to Ayer wrote lucid prose, they have ensured full employment in the future by writing in language so obscure that their own presence (they say) is necessary to interpret it."³

¹ E. R. Hughes, *Chinese Philosophy in Classical Times*.

² J. B. S. Haldane, "Science and Politics" in *Possible Worlds* (London: Chatto and Windus, 1928), p. 185. Italics added.

³ Hugh Trevor Roper, "Time for a New Game," a review of *Words and Things* by Ernest Gellner (London: Gollancz, 1959), *Sunday Times*, London, Oct. 11, 1959, Magazine Section, p. 16.

Our Wasted Investment

There can be no question that, in an effort to give other countries the benefits of American "know-how," some substantial, if indeterminate, proportion of the large investment made by the United States, both through public and private channels (such as some of the foundations), has been wasted. It has been wasted because the medium of communication in which this "know-how" is expressed has not yet been organized. As the late Lord Fisher once annotated a minute from the First Lord of the Admiralty, Arthur Balfour, "If the trumpet give an uncertain sound, who shall prepare himself to the battle?"

Evidence that this is so could be built up by considering almost any of the words commonly used in writing on management subjects—*administration*, *organization*, *staff*, *leadership*, *principle*, and so on. Virtually every author has to define the meaning in which he is using the most ordinary terms or risk being attacked by some other writer who is using the same word in a totally different meaning, often a meaning loaded with adverse emotional associations.

But to prove the point, it is unnecessary to go further than the word *management* itself. Consider the following sentence:—

"The top *management* (a) of the Nameless Corporation Inc. have decided that *management* (b) development is matter of *management* (c) policy to which special attention will be given in the next *management* (d) period: all members of the *management* (e) will attend seminars in *management* (f) twice weekly: special attention will be given to relations between *management* (g) and workers and to examples of good *management* (h): for this purpose the term *management* (i) does not include Vice-Presidents and foremen."

It is not suggested that this sentence has ever appeared in the literature of the subject or in any corporate communication. It carries the stigmata of ambiguity too clearly on

its face. But it is not, in Stephen Leacock's phrase, "a moonbeam from the larger lunacy." Examples may be found in the literature of the use of the word *management* in all the eight meanings thus brought together.

Another alternative is to consider some of the definitions of the term advanced by various authorities. *Webster's College Dictionary* gives "1. Act of managing. Owners and executives as distinct from labor."⁴ *The Concise Oxford Dictionary* is more dubious. It reads "In verbal senses, also or especially; trickery, deceitful contrivance; *the management*, governing body, board of directors."⁵

Twenty Vague Definitions

It has been a short while since I made a collection of some 20 or more definitions of the term *management* culled from American writers whose works are on the shelves of my library. Beyond attempting to select from those authors who seemed to have some authority (from Taylor to the present day) the choice was fortuitous. But from this modest experiment I learned that management is "a function, a process, structures, a part in the organization, an act, the development of persons, a philosophy, methods, principles, techniques, persons, knowledge, relations, a mental attitude, a collection of elements, an art, a science, a group of activities, a phase of an undertaking, a force, a group of people, an activity, and an organ."

The reason for this confusion is, of course, simple. The process of managing and the word *management* itself preceded by some centuries any idea that it might become the subject of study which aimed at exactness. Consequently, the word has collected a whole range of connotations, of emotional associations, of overtones and undertones, some of which have become obsolete while others bear little relation to the meanings in which it is most commonly used today. Murray's full Oxford Dictionary gives no less

⁴ *Webster Handy Collegiate Dictionary*, Signet Book, New York, New American Library, p. 281.

⁵ *The Concise Oxford Dictionary of Current English* (Oxford, The Clarendon Press, 1929), p. 695.

than seven distinct definitions of the term and twenty-two definitions of the verb "to manage." In one dialect usage in Great Britain, *management* is a synonym for manure.⁶

If, however, a word is to be a reliable instrument of exact discussion, it must fulfill certain basic conditions:

- It must have a precise connotation, a clear meaning.
- It must have only one such meaning.
- It must have a specific referent, a concrete object or situation in the real world to which it applies: it must be in no way vague or abstract.
- Its one meaning must be constant; it must not be used with different shades of meaning in different contexts.

A consideration of the eight or nine meanings in which the word is used in the sample sentence quoted above will at least clarify some of the *reasons* why its uses have become so varied. All these meanings are concerned with its modern and popular usage as concerned with the conduct of organized effort of some kind. These meanings are:

(a) With the prefix "top," as a noun defining a group of people, i.e., those associated in the control of an undertaking at the highest level.

(b) As an adjective qualifying the word development, meaning development of those who are already or are likely to become managers.

(c) As an adjective qualifying the word policy, meaning policy about or formulated by those engaged in managing.

(d) As an adjective qualifying the word period, meaning budgetary period—the period over which the results of managing are assessed financially.

(e) With the prefix "the"—as a noun defining a group of people, presumably those occupied in managing. But since the title "manager" is a symbol of status, it is usually

a somewhat indeterminate group, dependent on the social outlook of the institution to which it is applied. Undoubtedly anyone who supervises the work of another person is, in so far as he does so, managing. But there have been quite bitter controversies as to whether foremen were part of "the management." And in most undertakings, the operator with a single assistant would not be so regarded.

(f) As a noun referring to the body of knowledge about managing.

(g) As a noun defining a group of people, but again a different group to that referred to in a. and c. Usually in this connotation, it refers loosely to all persons employed by any undertaking who are not rank and file operators—broadly those who, it is anticipated, would be on the side of the managers in any dispute with organized labor.

(h) As a noun defining an activity—the activity of managing.

(i) As a noun with the same meaning as in e. This clause illustrates the difficulty of accurate definition where the word is used in this sense.

These various uses of the word fall into a number of different categories:

1. As an adjective (b,c,d). This is presumably due to the fact that the true adjectival form of the verb "to manage" which is *managerial* is somewhat clumsy. It also refers rather to managers than to the subject of management (see 4 below). There is no suitable adjectival form of the noun management, meaning the body of knowledge.
2. As a collective noun of different groups of people (a,e,g,i). The inconvenience and vagueness of this use and the possibilities of misunderstanding and conflict to which it gives rise are apparent from the analysis.
3. As a noun describing an activity, viz. managing (h).
4. As a noun describing a subject, the body

⁶ A *New English Dictionary*, edited by James A. H. Murray (Oxford, The University Press, V vi., 1933).

of knowledge about the activity of managing (f).

The study or body of knowledge about the activity of healing is called medicine. But those who practice this activity are known as doctors or medical practitioners, and the activity is usually referred to as "medical practice" or merely as "practice." If we followed the ambiguous and multipurpose usage which now obscures meaning in our use of the word *management*, instead of saying "doctors study medicine to improve their practice" we should say "the medicine study medicine to improve their medicine."

It would greatly simplify discussion and writing if all concerned would agree that:

- The use of the word *management* should be confined to the body of knowledge about the activity, viz., managing.
- That when referring to the activity, active participle *managing* should be used.
- That when referring to those engaged in the activity, the ambiguous collective *the management* should be avoided, and *managers* or *the managers* should be used.

By itself, however, such a self-denying ordinance would not clear up all ambiguity. The questions: what is managing? what are the scope and limits of the activity? would remain. Attempts at clarity are defeated by prejudices which are political in origin and character.

Political Prejudices that Cloud Clarity

The idea that there might be an organized body of knowledge about managing originated in the United States sixty or seventy years ago, largely as the result of the work of a group of engineers of whom Frederick Winslow Taylor was the most conspicuous. It started in connection with business. Parallel with but independently of this initiative, a Frenchman, Henri Fayol, was developing the same idea. Since in the French language there is no exact equivalent to the

English word *management*, Fayol called his book *General and Industrial Administration*. (*Administration Industrielle et Generale*).⁷ His use of *administration* is equivalent to *managing* in English.⁸ He too was in business most of his life. But he saw quite clearly from the beginning that such a body of knowledge was equally applicable to the problems of undertakings owned and operated by the community. After retiring, he undertook a major reorganization of the French telephone and telegraph services.⁹

But he was equally clear that this activity or function of managing was only a part of the total activity of governing. "The managerial function," he wrote, "should not be confused with government. To govern is to conduct the undertaking towards its objective by seeking to derive optimum advantage from all available resources and to ensure the smooth working of the six essential functions. Management is merely one of the six functions . . . but it has such a large place in the part played by higher managers that sometimes this part seems exclusively managerial."¹⁰

This view is also accepted in the United States. Departments of the Federal Government, the combat services, and many other public agencies, including the Tennessee Valley Authority, have deliberately adopted a policy of using knowledge about managing as a contribution to the total task of conducting their various activities. David Lilienthal, onetime Chairman of the TVA, has written, "The TVA is a significant departure as an instrument of twentieth-century democracy in this: that, in creating the TVA, Congress adopted and carefully wrote into law the basic principles and practice of modern *man-*

⁷ Henri Fayol—*Administration Industrielle et Generale* (Paris, Dunod Freres, 1925). The French text was published originally in the Bulletin of the Societe de l'Industrie Minerale in 1916.

⁸ Cf. The English translation of the above Henri Fayol, *General and Industrial Management*, translated by Constance Storrs (London: Sir Isaac Pitman & Sons, Ltd. 1949).

⁹ *L'Incapacite Administratif de l'Etat—Les Postes et Telegraphes* published in the *Revue Politique et Parlementaire*, 1921 and, subsequently, in book form by Dunod Freres.

¹⁰ (See note 8).

agement."¹¹ And again, "Standpatters within government can sometimes manage to make official life uncomfortable and abbreviated for the many administrators and managers who insist that there can be no such thing as a personal or political vested right in established government practice, however venerable; but this will not stem the tide of the public's demand that their government adopt the essentials of modern *management*."¹²

The late President F. D. Roosevelt said in an important official document—"a government without good *management* is a house builded on sand."¹³

All of these statements imply that managing is a *part* of the total task of conducting, that is, of governing, any institution. A business corporation is unquestionably a social institution, and to conduct its affairs as a whole is to govern it. But among business people in the U. S., there is a very strong feeling that the intervention of public authority in the ownership or control of economic enterprises is socially undesirable. And, since the study of management originated in private business, this emphasis on the contrast between the two systems of ownership has tended to creep into the language. Men speak of "government" and "business *management*" as though they were opposing methods of conducting systems of human cooperation.

Thus, *managing* is used with reference to one kind of activity to express a *part* of the total process of governing, and with reference to another to express the *whole* process.

Confusion due to this cause has increased in recent decades because of what has been described as "the gradual erosion of the Board of Directors as a functioning organ of the enterprise. . . . The Board, as conceived by the lawmaker, is at best a tired fiction."¹⁴

Unquestionably in the corporation laws of most of the 50 States, the Board of Directors is still, in theory, the governing, the ultimate authority in a business corporation. But so many of its functions have been taken over by the executive group who are, nominally, its subordinates, that the real locus of power rests with them and not with the Board of Directors.

Whether this tendency is desirable or not from the standpoint of practicality is a debatable question.¹⁵ From the standpoint of the present discussion, however, the important point is that it tends to confuse the processes of governing and managing. That is to say, it prevents people from keeping clearly in mind a distinction which has hitherto been considered fundamental in American thought about government, the distinction between the legislative and the executive spheres of action.

It is a distinction which is of increasing importance as managing becomes progressively more technical. It is only on condition that this distinction is clearly identified and its importance appreciated that it is possible to keep managing reasonably free of the infection of politics. As has been well said, "Facts and experienced judgment, not political views, are the foundation of dependable technical decisions and action. . . . Once politics enters, the entire edifice of an enterprise built upon technical skills becomes unsafe. The whole enterprise would be infected by half-technical, half-political judgments. Public confidence in its integrity would soon fade. . . . There are all kinds of politics; administrators and experts must see to it that they keep out of all varieties."¹⁶

This is not to suggest that political issues can be ignored or are wholly avoidable. What is important is that men should recognize when they are being political and when they are being technical, and that the two kinds of activity should be clearly dis-

¹¹ David E. Lilienthal, *TVA-Democracy on the March* (London, Penguin Books, 1944), p. 144.

¹² (See note 11), p. 153.

¹³ Letter submitting to Congress the Report of the President's Committee on Administrative Management, 1937. Government Printing Office, Washington.

¹⁴ Peter F. Drucker, *The Practice of Management* (New York, Harper & Bros. Ltd., 1954), p. 178.

¹⁵ E. Everett Smith, "Management's Least-Used Asset: The Board of Directors" in *The Dynamics of Management*, New York, American Management Association, 1958, Report No. 14, pp. 49-60.

¹⁶ David E. Lilienthal (See note 11), pp. 154, 158, 159.

tinguished. In modern democracies, the decisions involving value-judgments are best taken by groups. Collaborative *action*, however, demands individual leadership. That is the function of leadership. It is the catalyst which turns authority, "the formal right to require action of others," into power, "the ability to make things happen."¹⁷ In all large-scale systems of co-operation, a complex of positions of formal authority, an organization, is essential if communications are to be preserved. If that authority is to be acceptable, if the system is to work, the behavior of those occupying such positions must convince all those whose collaboration is necessary that their communications are in line with the broad value-judgments of the group. Otherwise those others will not regard such communications as "authentic."¹⁸

Managing vs. Governing

It is therefore important to distinguish managing, which is an executive and largely individual task, from governing. The tendency to use the word *management* when applied to business to cover the whole of the functions of governing is confusing and handicaps the development of knowledge about managing.

If this distinction is accepted, *management* may be defined as the body of knowledge about managing. And *managing* may be defined as getting things done through people. This definition implies that there has been a process anterior to the activity of managing, the process of deciding what things are to be done. This policy-making or political or legislative process can then be kept distinct from the executive processes to the great advantage of our knowledge and understanding of the latter and the identification of true executive responsibility. In short, an alternative definition of *managing* emerges—the executive aspect of the art of government.

The advantages to the study of manage-

ment which would accrue from an attempt to drain the semantic swamp in which it presently labors cannot be exaggerated. No democrat would suggest that anyone should attempt to lay down the law about the use of terminology. Language is a living thing and cannot be cribbed, cabined, and confined in a network of imperatives. But it is possible to set standards. And, standards, if they are well set, have a habit of attracting the support of responsible people.

The initiative in any such attempt must come from the United States, which has led the world for half a century in this particular field of knowledge. Four main groups are concerned: each of them has its representative organizations. They are business itself, the management associations, the public agencies interested in management, and the institutions teaching management.

A Standard Glossary of Terms

Is it too much to suggest that these organizations might well get together to nominate a small group of some seven to nine qualified persons to issue an American Standard Glossary of Management Terms with the approval and support of all these organizations? Initially, only the commoner terms should be included.

The remit to such a group should make it clear:

- That their task is *not* to compile a dictionary which merely lists the current multiple uses of each word. It is to produce, for each term included, a *single* standard definition which they recommend for universal use.
- That they should avoid the obvious temptation to reconcile conflicting interests by producing definitions which include *all* the shades of meaning attached to terms by different groups. They should aim at single, simple, concrete definitions in the shortest possible words.

The very existence of such a standard

¹⁷ Definitions of *authority* and *power* from Mary Parker Follett.

¹⁸ Chester I. Barnard, *The Functions of the Executive* (Harvard University Press, Cambridge, Mass., 1938), p. 180.

glossary would be a great convenience for all those writers and students who accepted the definitions. It would be a challenge to those who did not at least to state alternatives and to give their reasons for preferring them. Interest would be focussed on the problems of the semantics of the field, and a start made in attacking the present confusion.

It is appreciated that, probably the greatest obstacle to such a development, however desirable, is financial. Each of the institutions mentioned has already far too many projects of its own for its limited resources. And, to induce a larger group of institutions to subsidize a project of general interest of this description is a herculean task. Might not one of the foundations which have contributed so generously to the objectives of some of the individual institutions consider investing in this task of intellectual spring-cleaning?

It may be argued that words and their

meaning and their exact use are unimportant. But words are the tool-room of all constructive intellectual effort. And where the tool-room of a subject is ill-arranged and untidy, that study can contribute little either to knowledge or to the practical well-being of mankind. In an appeal addressed to his students, the late Sir Arthur Quiller-Couch, sometime Professor of English Literature at the University of Cambridge, once said "let me remind you that you cannot use the briefest, the humblest process of thought, you cannot so much as resolve whether to take your bath hot or cold, or decide what to order for breakfast, without forecasting it to yourself in some form of words. Words are, in fine, the only currency in which we can exchange thought even with ourselves."¹⁰

The currency of management is grievously inflated. A drastic re-evaluation is overdue.

¹⁰ Sir Arthur Quiller-Couch, *On the Art of Writing* (Cambridge, England: The University Press, Pocket Ed., 1923), p. 28.

A word is not a crystal, transparent and unchanged. It is the skin of a living thought and may vary greatly in color and content according to the circumstances and the time in which it is used.

Justice Oliver Wendell Holmes
Towne V. Eisner, 245 U.S. 418 (1917)

Checkpoints for Administering Capital Expenditures

ERICH A. HELFERT

Does the control of your firm's capital expenditures measure up to that of the three large industrial concerns reported here?

U. S. business firms currently plan to invest at the rate of \$34 billion in new plant equipment and in rebuilding and overhauling existing facilities. In the interest of profit maximization, such expenditures should constitute sound investments properly conceived, developed, approved, and carried out. Management has a serious obligation to supervise these outlays and to make sure that they are undertaken for purposes beneficial to the enterprise.

The evaluation of capital expenditure projects in terms of financial return or relative desirability is becoming widely recognized as a method of supervising such outlays. It appears that management has a growing awareness of the values to be derived from rigorous factual analysis of such projects.¹ Uncertainties in decisions involving future expectations, such as the case in capital outlays, are always present. An analysis based upon as many facts as are reasonably obtainable, however, and the use of such tools as the financial method of determining the rate of return of a given project or the optimum point of replacement as given by the MAPI formula² form a better basis for decision making than a "hunch" or so-called "rule of thumb."

Measuring the return of capital expenditure projects, however, is only one step in a

whole series which must be taken to ensure sound control over the spending of capital funds. If it is assumed that it is management's duty to safeguard the investment and to utilize additional opportunities for investment in order to maintain, and preferably to improve (ideally to maximize), the owner's return on his investment, it is also management's duty to establish and administer the controls that will enable them to delegate the burden of analysis, to make the appropriate decisions, and to follow through on the decisions.

It is the purpose of this article to discuss several important aspects of this control system and to present some of the findings of a study of three large industrial enterprises, all of which have gone through the experience of establishing capital expenditure control procedures.

Capital Expenditure Control Steps

Step one: Every capital expenditure starts with a need. It may be based on a new product, for which new and different tools have to be obtained. It may be based on expansion necessary to serve an increasing market. Technological changes may force a switch to a new method of production. Replacements of worn-out or obsolete machine tools may become mandatory. A new cafeteria, locker rooms, or a new parking lot may be required. For any of these reasons and many more, capital funds must be expended and employed in such a way that the profitability of the enterprise is maintained or improved.

¹ E.g., see "Tested Approaches to Capital Equipment Replacement," American Management Association, Special Report No. 1 (New York, 1954); John G. McLean, "How to Evaluate New Capital Investments," *Harvard Business Review*, November-December 1958.

² See George Terborgh, *Business Investment Policy*, Machinery & Allied Products Institute (Washington, D.C., 1958).

In any company, a greater number of alternative opportunities offering a tangible return on investments will exist than can be seized and utilized. Some of them will bring a very large return, such as the invasion of a rich untapped market; others are needed simply to preserve the competitive strength of the enterprise. Some will bring a small return, since they constitute only a minor improvement. In other cases, the return may be indeterminate because no tangible dollar-and-cents profit or savings can be measured.

Whatever the promised return, management should *become aware* of the need through a sound procedure which allows recognition of the greatest possible number of opportunities at reasonable cost.

Step two: Once a number of ideas for needed capital expenditures has been obtained, a process of *preselection* must begin, since it will not be possible to examine in detail every single idea. The most obvious ones will have to be selected for further processing, while ideas of little promise will be dropped or postponed. Actually, steps one and two will often be combined, and ideas rejected or accepted as they appear. This does not change the basic concept of control, however, which implies that the preselection of ideas acceptable and worthy of further investigation will rest on sound criteria. Rules of thumb like the payout period, where considered applicable, may tend to bias the judgment of the person choosing the idea; yet the depth of the preliminary analysis will have to vary with the importance of the project.

Step three: The most desirable ideas, after thorough analysis, are assembled and ranked, according to size and profitability, in the capital budget. The capital budget is a plan of capital outlays based upon the availability of funds and contains estimates of dollar outlays and their timing listed under major categories and departments. In order to establish a meaningful budget, the

criteria for inclusion of projects, as well as for the availability of funds, must have been defined. The capital budget becomes a tool of control inasmuch as it forces all levels of management to think realistically about their projected capital needs and the opportunities of investing them over a specific period of time. It further sets a general, yet flexible, limit on the allocation and outlay of funds, and permits planning of the supply of funds needed to finance the outlays listed therein.

Step four: Individual *project approval* for execution usually comes after the budget has been drawn up in the previous operating period. This approval procedure provides for uniform presentation of projects, their review by qualified personnel, and their approval by authorized members of management. The criteria used in evaluating the projects (minimum standards developed with consideration given to the cost of capital), the thoroughness of the review, and the timeliness and relevance of the authorization in relation to the importance of the project are important for the control of capital outlays. Usually, lower levels of management are delegated the power to authorize projects up to a certain dollar limit, thus freeing higher management from the effort of reviewing routine projects. To meet changes in conditions, substitutions and alterations in projects are often made at this point.

Step five: From authorization to completion of the project, controls are necessary to shepherd its *progress* and to ensure that the actual use of the funds appropriated meets with the original intent of the outlay. Furthermore, it must be seen that the amounts appropriated are not exceeded, or if they are not fully spent, that they are returned. Time schedules have to be maintained, and specifications met. If the project is to stay within the meaning and expectations attributed to it when planned, the spending-process controls must be adequate to detect deviations and to allow for corrections or necessary adjustments.

Step six: Finally, a *post-completion audit* or follow-up should be made. In the interest of control, the audit should reveal any significant deviations from the project's expected performance. By having all major projects and a sample of minor projects audited, management can use the experience to adjust future planning to eliminate bias, incompetence, or other wasteful factors.

This brief statement of the six major phases of capital-expenditure control is intended to serve as a basis from which to discuss in more detail a selected number of aspects from steps four to six. Among the companies studied, the more significant problems occurred in these latter areas, although the importance of the other areas should not be minimized.

Project Uniformity

Since the capital budget usually has been established on the basis of summary figures and departmental totals built up by the operating units of the company and is authorized in total by the president and the board of directors, approval for execution of individual projects becomes an important final screening, review, and control device. Projects are presented to authorized management members who act upon them after reviewing the project data (or after having them reviewed by staff experts).

In the interest of factual and unbiased appraisal, the projects presented to management should have been prepared as uniformly as possible and contain relevant data, including profitability calculations, in such form that reviewing persons can readily compare and rank projects at least within major project "classes."

A pattern of project classifications, such as expansion projects, replacement projects, necessity projects (elimination of stoppages, hazards, etc.), new product projects, etc., is an important help. By patterning the project

data according to the particular classification, three major benefits can be derived:

- The project classes themselves characterize the relative urgency of the projects they contain.
- The analyst's job of compiling the relevant project data can be aided by stating minimum requirements for the information to be given for projects in each classification.
- The reviewer's duty of judging the completeness as well as reasonableness of the project information is lightened.

More important from a management point of view, however, is the fact that project comparability within given categories may favorably affect the attitude of lower management at the division and plant levels. The funds for which these levels compete are usually limited. As will be seen later, these management members insist on "equal" treatment and unbiased project evaluation.

In the companies studied, the minimum information required on the project forms was limited mainly to the following: date of the project proposal; number of the project; location (department, plant, division); identification by category, size, or class; operating savings, if any; capital and expense outlays; authorizations (signatures).

In some cases, a more detailed breakdown of the required funds was requested, mainly along the accounting rules established in the company. The detailed explanation of the reasons for the project, as well as descriptions, effects, etc., were largely left to the project analysts.

Interviews with plant and department managers indicated a belief that a verbose description of project benefits in an accompanying letter at times might affect decisions by higher management even if the project were inferior to others not so well presented. Therefore, it may be worthwhile to establish *checklists* not only of the minimum information definitely required, but also of points

that might reasonably be raised in the analysis of a project, yet cannot formally be printed onto the project sheet because of lack of space and in the interest of form simplicity. What is being proposed here is a list of challenging questions to be raised about any project, such as "what will its effect be upon the quality of output?" or "what will be the risks of obsolescence in this case?" or "what has been done in other plants about this problem?"

Clearly, not all of the questions in such a list would be applicable to any given project. Nevertheless, if the project analyst has at his disposal a great variety of questions (which could be classified by project type), he has a better basis for making an effective analysis of the request than if he relies completely on his own preferences. The important aspect of this discussion is the fact that management must help secure a flow of projects comparable to each other in terms of a sober, all-inclusive approach to their justification, from the various divisions or branches of an enterprise.

It may be said that a little competition among the various departments proposing projects is not harmful. It should be kept in mind, however, that each analyst and the operating unit he represents should have as close to an equal chance as possible of receiving approval for a good project. If complete and convincing analysis is a factor in project approval (and the findings in the study cited here seemed to support this), then management should establish procedural and informational bases for achieving this completeness.

The Review Process

Once the projects, with supporting analytical detail, have been presented, a chain of authorizations is generally necessary to bring them to realization. In this process, there are several points worth investigating. The most obvious one is the question of the thoroughness with which projects are reviewed. It is fair to state that very often

higher management members are not qualified technically to pass judgment upon the intricacies and expectations of new capital equipment. Also, it may be very difficult for management to appraise the quality of the economic forecasts made by the analyst, especially where the technical characteristics of the equipment govern the realization of such figures.

Consequently, there arises the question of obtaining the services of individuals who, by training and experience, are qualified to pass such judgment. This need does not apply only to purely technical appraisal. The use of more sophisticated approaches to a rate of return calculation with the help of discounted cash flows, or a probability approach to risk factors, also calls for skills not commonly found in the engineering or production departments of companies.

Among the companies studied, there was one in which top management had given express recognition to this need. Two engineers with long service in various divisions of the company were appointed to form a full-time "appropriations review committee" which not only would screen finished proposals over \$25,000 but also would assist in the preparation of such projects during the early stages of the assembly of data and information. As the management of this company expressed it, they wished to remove much of the burden of detailed technical review from their own shoulders and vest this control in two qualified people. Judging from the comments of the committee members and personnel exposed to their activities, these two men were looked upon as helpful experts who not only could speed project preparation and review, but also could ensure greater uniformity and completeness. It was further believed that the review by the two engineers considerably speeded project approvals.

In the other companies, some form of technical review was brought to bear upon the projects as they were developed, but not in the express form of the first case. In all of

the companies, the purely technical review was predominant, however, and less emphasis was placed on the economic forecasts. This emphasis was related back to the predominantly engineering and "shop" backgrounds of the reviewing personnel. It is significant, however, that the company mentioned above had already made it a policy to establish expert review with the express purpose of freeing management from this burden.

Intimately related to the question of the thoroughness and reliability of review are the extent and timeliness of approvals. Good control requires air-tight procedures to ensure that only worthwhile and profitable

projects are selected and approved for spending. At the same time, the level of approval sought must be commensurate with the importance of the project in question. Inasmuch as most of the projects in the average firm are relatively small (below \$10,000 capital outlay) and routine in their character, it would profit a company to establish policies which allow for a certain amount of delegation of the approval authority.

An attempt was made to gauge the effect of speeding up approvals by delegating approval authority to different levels of management according to the cost of the project. Sample projects from each of the companies studied were examined to determine the

TABLE I
APPROVAL TIME REQUIRED
22 Sample Projects, Picked at Random
Company A (Most delegation)

Project Number	Size* (approx.)	Project Class	Approval Time (weeks)	Savings or Increased Profit†
1	\$83,000	New Product.....	4	N.A.
2	73,000	New Method.....	10	\$108,000
3	49,000	Working Conditions.....	2	....
4	33,000	New Product.....	5	N.A.
5	22,000	Cost Reduction.....	6	\$ 20,000
6	15,000	Office Improvement.....	.5	N.A.
7	10,000	Additional Capacity.....	1	N.A.
8	10,000	Office Improvement.....	3	N.A.
9	10,000	Replacement.....	4	Necessity‡
10	8,000	Rebuilding Equipment.....	1	N.A.
11	7,000	Working Conditions.....	7	....
12	7,000	Cost Reduction.....	2	\$5,100
13	6,000	Unusual Maintenance.....	1	N.A.
14	6,000	Reception Room.....	49§	....
15	5,000	Replacement.....	0	Necessity
16	5,000	Cost Reduction.....	1	\$12,400
17	4,000	New Product.....	0	N.A.
18	3,000	Additional Capacity.....	3	N.A.
19	3,000	Rebuilding Equipment.....	3	N.A.
20	2,000	Additional Capacity.....	0	N.A.
21	2,000	Unusual Maintenance.....	0	....
22	2,000	Cost Reduction.....	0	\$2,200
AVERAGE APPROVAL TIME:.....			2.5 Weeks	
Projects over \$10,000:.....			4.5 Weeks	
Projects under \$10,000:.....			1.7 Weeks	

* Includes capital and "expense" portions of outlay.

† Expected for the next operating year of the project.

‡ Other alternatives considered too expensive; savings not formulated.

§ Excluded from average as extraordinary.

Source: Company Records.

length of time it took for approval. As could be expected, the company with the least delegation of spending authority had the highest average elapsed time between the date of the project and the date of the last approval signature (see Tables I, II, and III).

The significance of delays in project approvals arises from the following reasoning: Once a capital spending idea emerges and is reasonably established as profitable or desirable, any unnecessary delay in its adoption leads to lost benefits. This urgency does not abrogate the need for thorough and rational decision making; the emphasis is on *unnecessary* delays. As we have stated before, it is doubtful whether higher management is either technically qualified, or sufficiently

interested (justified) in approving more routine projects, and the passing of projects along the approval chain could very well be waste motion.

The cost of this waste motion is even more evident when we consider the size of the possible loss through delays: In all of the companies studied, savings or incremental returns from a large percentage of capital projects exceeded 50 percent of the original investment and many times amounted to 100 percent. Even a relatively brief unjustified delay caused by routines of processing is prohibitively costly, as shown in the following example: On an investment of \$5,000 with a savings potential of 100 percent during the first year of the capital outlay, a

TABLE II
APPROVAL TIME REQUIRED
22 Sample Projects, Picked at Random
Company B (Some delegation)

Project Number	Size* (approx.)	Project Class	Approval Time (weeks)	Savings or Increased Profit†
1	\$148,000	Replacement.....	3	N.A.
2	89,000	Additional Capacity.....	4	N.A.
3	62,000	Quality Improvement.....	5	N.A.
4	58,000	Replacement.....	7	N.A.
5	42,000	Replacement.....	2	\$8,460‡
6	40,000	Product Change.....	4	....
7	37,000	Additional Capacity.....	5	N.A.
8	36,000	Cost Reduction.....	2	\$11,760‡
9	35,000	Additional Capacity.....	3	N.A.
10	34,000	Replacement.....	2	\$9,820‡
11	34,000	Additional Capacity.....	2	N.A.
12	30,000	Replacement.....	10	\$2,720‡
13	29,000	Additional Capacity.....	1	N.A.
14	27,000	Product Change.....	4	....
15	19,000	Additional Capacity.....	3	N.A.
16	17,000	Additional Capacity.....	6	N.A.
17	16,000	Additional Capacity.....	3	N.A.
18	15,000	Additional Capacity.....	2	N.A.
19	14,000	Replacement.....	3	N.A.
20	13,000	Replacement.....	3	\$3,520‡
21	13,000	Replacement.....	4	\$8,260‡
22	12,000	Replacement.....	5	\$1,140‡

AVERAGE APPROVAL TIME:..... 3.8 Weeks
(All projects are over \$10,000)

* Includes capital and "expense" portions of outlay.

† Expected for the next operating year of the project.

‡ Determined through the replacement formula.

Source: Company Records.

delay of only five weeks amounts to \$500 in savings lost—a "cost" of 20 percent on the average investment or 10 percent on the total investment. For purposes of this article, we shall neglect the fact that the very existence of projects returning 50 percent and more on the investment points to a need for more complete opportunity spotting at the idea stage. This fact in turn seems to indicate incomplete control of the capital expenditure process. But this is a subject all of itself.³

³ See John B. Matthews, Jr., "How to Administer Capital Spending," *Harvard Business Review*, March-April 1959.

Control of Physical Completion

Once management has put its stamp of approval on the project, the control process is far from completion. There are several areas in which continuous watchful control must be exercised. Obviously, a project's path from paper to tangible asset is exposed to many risks, delays, possibilities of error and other obstacles. Our basic premise is that if the principle of profit maximization is to be preserved, the speedy completion of a project is mandatory once the project has been recognized as good.

TABLE III
APPROVAL TIME REQUIRED
22 Sample Projects, Picked at Random
Company C (Least delegation)

Project Number	Size* (approx.)	Project Class	Approval Time (weeks)	Savings or Increased Profit†
1	\$118,000	New Product.....	2	N.A.
2	85,000	Additional Capacity.....	3	N.A.
3	55,000	Working Conditions.....	3	....
4	27,000	Rebuilding Equipment.....	1	N.A.
5	25,000	Working Conditions.....	8	....
6	13,000	Addition Laboratory.....	17	....
7	12,000	Cost Reduction.....	11	\$12,000
8	11,000	Replacement.....	8	Necessity
9	10,000	Additional Capacity.....	4	N.A.
10	7,000	Safety.....	9	....
11	7,000	Replacement.....	8	\$1,100‡
12	5,000	Cost Reduction.....	6	\$20,000
13	5,000	Replacement.....	4	\$1,500‡
14	5,000	Replacement.....	13	Necessity
15	5,000	Additional Capacity.....	4	N.A.
16	5,000	Replacement.....	5	\$2,400‡
17	4,000	Addition Laboratory.....	26	....
18	4,000	Rebuilding Equipment.....	13	Necessity
19	4,000	Cost Reduction.....	3	\$1,800
20	3,000	Working Conditions.....	3	....
21	3,000	Cost Reduction.....	4	\$1,430
22	3,000	Cost Reduction.....	53§	\$4,950
AVERAGE APPROVAL TIME:.....			7.4 Weeks	
Projects over \$10,000:.....			6.6 Weeks	
Projects under \$10,000:.....			7.7 Weeks	

* Includes capital and "expense" portions of outlay.

† Expected for the next operating year of the project.

‡ Determined through the MAPI formula.

§ Excluded from average as extraordinary.

Source: Company Records.

Consequently, several dimensions of control appear:

- The project should be completed within the dollar estimate (or as closely as possible within the estimate, unless the purpose of project might be defeated through strict adherence).
- The project should be completed reasonably within the time estimated when the original analysis was made.
- The project should be completed within the original intent and meaning of the analysis, and changes in its character should be authorized formally. If not all the funds appropriated for the purpose are needed, the excess should be returned and made available for other projects properly authorized, while additional funds needed for the original project should be obtained through proper authorization.

The Dollar Dimension

Management should keep track of capital spending through periodic progress reports showing, usually by project or project group, the amount authorized, the amount spent to date, and the amount still required. The problem of control in this area is closely akin to budgeting in general: The original estimates are used as guidelines to ascertain the quality of actual performance. Our comparison also brings up a problem which is generally encountered: If the budget (project estimate) is used as a device for control, how is this control to be *exercised* to obtain the best possible results? This question raises a whole host of considerations and risks, all of which rest upon the fact that the controls do not deal with inanimate matter but rather with the estimates, actions, and probably most important, the feelings and reactions of human beings. Behavioral scientists have shown that feelings and reactions of people do count very heavily in the effectiveness of an enterprise.⁴

More specifically, the managers of all three of the companies studied had witnessed the importance of the human element as a factor in the control of the dollar dimension in capital outlays. Every one of the companies had passed through an earlier stage where the strictest adherence to the dollar figures in their capital outlay estimates was made mandatory by top management. Even very minor deviations, especially the need for additional funds, prompted severe reprimands of the persons "responsible." The top management considered the granted appropriations as the maximum allowable and expected compliance without question.

The reaction of the subordinates was as could be expected. All companies reported that serious "padding" of estimates resulted, and reviewing and authorizing personnel came to distrust most of the estimates presented. In one of the companies, the treasurer confided that it had become a practice of his department to subtract an automatic five percent from the capital outlay budget when he determined the cash requirements for the period, because he knew full well that the actual funds requirements would be at least that amount less. In the other companies, reviewing managers discounted funds requirements in a similar but mostly informal fashion.

After realizing that excessive strictness had begun to undermine the morale and reliability of their subordinates, the managers shifted to a somewhat more liberal approach. They asked for the most likely estimates with a provision that a "contingency" allowance (which varied between five and ten percent) *so labeled* could be included. While this did not change the over-all funds picture necessarily, the managers believed that the encouragement of honest estimates, and the open inclusion of a contingency allowance, would help overcome the padding practice that had crept in. Most important, deviations of actual needs from estimates were no longer denounced and singled out for serious criticism. Instead, attempts were

⁴ For example, see Chris Argyris, "The Human Problems with Budgets," *Harvard Business Review*, January-February 1953.

made to investigate the deviations and to find out *why* the estimates were off.

Finally, two of the companies swung to the realization that it might be best to require absolutely "honest" or "best" estimates, plan accordingly, and treat overruns and underruns analytically as unavoidable by-products of estimating activity. Interestingly, to several of the executives some of the fear of criticism appeared to linger on. These executives felt that since their companies continued to show actual capital outlays below the estimated totals, hidden contingency factors ("playing it safe") were contained in many projects. We investigated the relative performance of the companies on the basis of some of their own reports and found that all three companies tended to spend about 94 percent of the funds estimated for their projects (Table IV).

The significance of these observations lies in their showing the need for great care in the administration of the control program and particularly one of its aspects, the dollar dimension. It must be ascertained where and how the appropriated funds have been spent. The frequency of the review and its detail will depend on the number and complexity

of projects administered, and the form of the review will have to fit in the general records picture of a company. But the point of view to be taken when interpreting the findings is the critical issue at hand.

Admittedly, the uncertainty of determining the size of the capital outlay required is not as great as that of the projection of earnings or savings of a project, since bids and list prices can be obtained often for all or a significant portion of the project cost. Yet nondelivery or increased labor costs, unexpected construction difficulties, and many other factors still have to be estimated by the analyst. Consequently, it is definitely unrealistic for management to expect 100 percent compliance with even the best possible estimates, and one should be satisfied with a good batting average. In other words, it is reasonable to expect deviations from expectations in both directions. Management should concentrate on locating the causes for the most glaring ones, and be satisfied if on the whole an average will show reasonably close compliance with the budget. A definite bias one way or the other to the extent of 5 percent or more is a signal for action to investigate and to look for apparent or under-

TABLE IV
ACTUAL AGAINST PROJECTED CAPITAL OUTLAYS
All Three Companies
(Thousands of Dollars)

Company and Projects	Actual Outlay	Estimated Outlay	Actual as % of Estimate
<i>Company A</i>			
150 Projects selected from past nine years.....	\$5,370	\$5,710	94.2%
13 Projects at one plant, from past five years.....	234	252	92.8
36 Projects from one division, past year.....	358	384	93.3
23 Completed sample projects, past year.....	317	352	90.1
<i>Company B</i>			
71 Projects selected from past year.....	\$1,337	\$1,305	102.4%
66 Projects selected from past two years.....	968	1,034	93.6
25 Completed sample projects, past year.....	799	848	94.3
<i>Company C</i>			
230 Projects selected from past three years.....	\$11,129	\$11,863	93.8%
108 Projects selected from past year.....	7,797	8,334	93.6
19 Completed sample projects, past year.....	315	332	94.9

Source: Company Reports.

lying influences of the nature described earlier.

Generally, management should educate its subordinates in the belief that reasonable and honest estimates are expected, that deviations and errors are bound to occur occasionally, that these have to be used as learning experiences, and that management will look for a good average performance rather than for strict compliance on every project. This does not in any way obviate the need for the most sophisticated and educated estimating procedures. It is merely a call to eliminate tendencies (however subtle) to bias estimates to fit given management attitudes (however unrealistic) which impair the validity of the project as well as the trustworthiness of the whole organization.

The Time Dimension

As mentioned earlier, recognition of a profitable project idea inherently carries the need for timely introduction. We have treated the subject of timeliness in connection with obtaining authorization of a project. The same comments justifying such attention to timing are valid in the case of the time that elapses between the last authorizing signature and the completion of the project. This time span is important from the point of view of control, yet it is sometimes neglected.

In two of the companies studied, some attention, either formal or informal, was paid to this time span. The third company did not note on the project-analysis form any target dates, and subsequently there was no way

TABLE V
COMPLETION TIME REQUIRED
22 Sample Projects
Company B

Project Number	Size (approx.)	Project Class	Estimated* Time (weeks)	Excess† Time (weeks)
1	\$148,000	Replacement.....	14	16
2	89,000	Additional Capacity.....	38	19
3	62,000	Quality Improvement.....	22	8
4	58,000	Replacement.....	34	31
5	42,000	Replacement.....	25	(-6)‡
6	40,000	Product Change.....	35	16
7	37,000	Additional Capacity.....	35	13
8	36,000	Cost Reduction.....	36	17
9	35,000	Additional Capacity.....	40	5
10	34,000	Replacement.....	N.A.	N.A.
11	34,000	Additional Capacity.....	13	15
12	30,000	Replacement.....	26	20
13	29,000	Additional Capacity.....	9	12
14	27,000	Product Change.....	24	17
15	19,000	Additional Capacity.....	25	8
16	17,000	Additional Capacity.....	22	6
17	16,000	Additional Capacity.....	9	4
18	15,000	Additional Capacity.....	13	15
19	14,000	Replacement.....	9	19
20	13,000	Replacement.....	15	8
21	13,000	Replacement.....	17	18
22	12,000	Replacement.....	8	15

* Estimated time to complete after approval.

† Time in excess of estimate, up to point of reported completion.

‡ Completion before estimated time period.

Source: Company Records.

of checking how closely the actual times matched the estimated time periods. In the analysis of all three companies, the completion date was not fully clarified. There was some doubt whether the date shown on the project form signified the physical completion of the project or whether it merely showed the date of the last cost entry in the accounting records.

Where possible, actual times required to complete sample projects were compared with estimates. Invariably there were rather large differences between the two; that is, usually several additional weeks were required to complete a project. By subtracting from the total time required those days or weeks which were taken up by the authorization process itself, allowance was made for the fact that target dates had been fixed

before the authorization chain was set into motion. Tables V and VI show the resulting deviations. The managers of these two companies reported that some attempts were made to control the time dimension of project realization. A systematic approach could have proven useful at very little extra cost. For instance, the completion dates were difficult to ascertain. A memo from the plant location in question at the time the project was completed (to the extent of being operative or economically useful) would suffice to inform the central file personnel, who then could transfer the date onto the project papers.

Similarly, target dates could be firmed up by revising the original target date once the final approval had been secured. One of the companies solved this particular problem by

TABLE VI
COMPLETION TIME REQUIRED
22 Sample Projects
Company C

Project Number	Size (approx.)	Project Class	Estimated* Time (weeks)	Excess† Time (weeks)
1	\$118,000	New Product.....	26	27
2	85,000	Additional Capacity.....	52	23
3	55,000	Working Conditions.....	23	40
4	27,000	Rebuilding Equipment.....	14	17
5	25,000	Working Conditions.....	17	70
6	13,000	Addition Laboratory.....	35	23
7	12,000	Cost Reduction.....	N.A.	N.A.
8	11,000	Replacement.....	20	13
9	10,000	Additional Capacity.....	12	7
10	7,000	Safety.....	15	17
11	7,000	Replacement.....	N.A.	N.A.
12	5,000	Cost Reduction.....	N.A.	N.A.
13	5,000	Replacement.....	N.A.	N.A.
14	5,000	Replacement.....	20	3
15	5,000	Additional Capacity.....	8	15
16	5,000	Replacement.....	30	18
17	4,000	Addition Laboratory.....	7	33
18	4,000	Rebuilding Equipment.....	22	14
19	4,000	Cost Reduction.....	N.A.	N.A.
20	3,000	Working Conditions.....	15	28
21	3,000	Cost Reduction.....	5	22
22	3,000	Cost Reduction.....	26	55

* Estimated time to complete after approval.

† Time in excess of estimate, up to point of reported completion.

Source: Company Records.

stating its target dates as "months from approval." A more useful date could be obtained by simply asking the original project analyst to make a revised judgment at the time of the last approval. Delivery dates, the labor situation, or other factors influencing the realization date could have arisen in the meantime. The project forms could be drawn up to provide space for both the physical completion date and the revised target date.

Clearly, it may become necessary to draw a limit to the amount of detailed appraisal concerning the time dimension. Statistical analysis of the relative sizes and numbers of projects, as well as trial runs of the detailed method outlined here, may give clues as to the desirability of the procedure. Similarly, the experience of the company may show a certain normal delay, and analysts might be advised to adjust their thinking or reviewers might be asked to neglect in their fact finding delays of less than, say, two weeks.

Completion of the Project Within the Original Intent

All of the companies studied made some provision in their written procedures to maintain the original intent of the project and to handle excess or deficient funds. Next to the dollar dimension, this area of control was among the most clearly stated. The local internal audit agencies as well as the regular accounting departments were formally advised to watch the spending process and to bring any unauthorized applications of funds, excessive spending, or unused funds to the attention of top management. Because of the complex nature of capital expenditures, it is at times necessary to change the scope and character of the project. In the interest of control, however, differences in capital requirements must be recognized, accounted for, and properly authorized.

In the companies studied, higher management held that their subordinates often considered capital budget allocations in the form of projects or over-all amounts as "their own." These lower-level managers appar-

ently felt that any "savings" in capital outlay amounts that could be achieved ought to be credited to their department or plant to be used on other projects as they saw fit. At the same time, additional funds (overruns) required for given projects were sometimes considered by these managers as naturally justified by the fact that without the extra funds the project would be useless.

Higher management needs to convince lower management of the reasonableness of applying capital funds in the best interest of the company as a whole, i.e., any "savings" should be made available to the company for reallocation, while overruns, although definitely required, should still be brought to the attention of the original authorizing personnel. A sense of perspective should be maintained, however. To minimize the "cost of control," limits on overrun requests should be established below which no formal action would be required.

Preservation of the original intent of a project is closely akin to the dollar considerations. Properly analyzed and endorsed by management, a project becomes an investment opportunity with a satisfactory return. To change the physical nature of the project or to divert the funds to an entirely different project is a step which should be weighed carefully. Should such a move result in higher over-all earnings, the change may be desirable. Nevertheless, in the interest of control in general and of the over-all company performance, the original authorizing personnel should be asked for their approval. What may appear to be a desirable change from one division's point of view will not necessarily fit into the capital outlay program established for the company as a whole. Incidentally, the appearance of a great many proposals to change the intent of the project after authorization creates a doubt about the abilities and thoroughness of the personnel making the original analysis.

Post-Completion Follow-up

Much of the effort spent on capital ex-

penditure control can become useless if no attempt is made to see how closely the project originators have hewn to the mark. Obviously, there is a cost element contained in the process of re-examination. In general, however, companies which have begun to make post-completion audits consider the data obtained as useful in making analyses of future projects.

Important questions arise about the nature of the audit to be made, its extent, its timing, and the type of personnel to be charged with this duty. Two questions must be answered. Has the capital amount authorized been spent timewise and intentwise as planned? Has the basis for justification of the project been realized? The first point was covered under the system of control outlined in our previous section. The second point amounts to a reappraisal of the major estimates, assumptions and expectations which formed the basis for authorization. For instance, a project for cost reduction was analyzed on the basis of an assumed rate of production and of certain estimates of reduced labor, repair and other costs. An audit after completion would concern itself with gathering comparative statistics to ascertain whether these assumptions were realized, that is, whether the profits or savings were actually obtained.

The size of the project will determine the extent of the audit. The difficulty of deriving the data for a particular project from accounting records will be another determinant, since these records usually cover less specific cost information than the project proposal. For projects over \$5,000, for instance, an audit might be made of all the quantitative factors which were taken into account in the original analysis. Also, an appraisal of nonquantitative factors, such as a rise in the quality of output and improved working conditions, could be attempted. For projects below such a dollar limit, statistical samples could be taken to determine the trends in project realization. Other factors to be considered generally would be the timing

points of physical completion and target dates of such completion as well as the point of reaching full-scale production.

The timing of the audits should be such as to test a project *after* the break-in period required, or if it is desirable to make audits sooner than that, to make allowance for the fact that the project has to be broken in. This problem of break-in should also be considered at the time the project is planned, and projections of the period required for it should be made to enable the post-completion auditors to exercise their judgment on this point. A period of three to six months after physical completion of the project could be set up as the standard waiting period, with exceptions possible for projects of a radically different character. There also may be several such audits on a given project over a period of time if the importance of the project warrants this attention.

The type of personnel charged with the audit should have qualifications similar to those of the analysts. Good control practice will require a separation between the personnel who make the original analysis and those who make the post-completion audit. Otherwise, the reliability of the figures might be doubted. One of the companies studied made specific reference to this danger because it was discovered that, over a period of time, actual realization of project advantages had been uncannily close to estimates.

The audit practice in the three companies studied differed in extent, timing, and character. All three companies had established some form of post-completion audit and reviewed certain classes of projects at least once after a period of from six months to a year. The project classes selected for review were generally those for which the most sophisticated procedures and analytical tools had been developed. In all three cases, the classes were replacement projects. The existence of these fixed procedures invited a follow-up, since the factors for the original analysis were expressly stated.

Table VII shows, on the basis of samples taken by all three companies, the realization of project estimates obtained. The major reasons for variations, which were very great in the case of many *individual* projects but not excessive for large numbers of projects averaged together, were largely nonrealization of estimated productive volume and technical difficulties not anticipated when the project was analyzed. Minor factors were delays in deliveries of machines or product changes which obviated the project advantages.

The relative closeness observed on an average in the realization of project expectations led to comments in the three companies that a more detached audit program might be required. It was felt by two of the companies that the persons making the original analysis were in a position to influence the audit process, if they did not perform the audit themselves. This feeling of distrust, justified or not, could destroy many of the benefits to be obtained from an organized follow-up procedure.

Each of the companies had devised simple analysis forms which were to be used by the auditors. Generally speaking, here is an opportunity to channel the audit in such a way that most, if not all, of the original analysis can be reviewed. While the companies

studied mostly limited their audits to one or two classes of projects, the audit can be extended to most every class imaginable by providing checklists of questions to be considered by the auditor. An example of this approach is the universal checklist method used by Corning Glass Works.⁵

On large and important projects, one checkup or audit may prove to be insufficient, especially when the life of the project can be expected to extend over a decade or more. To check whether the originally anticipated expectations are still being realized, it is in the interest of profitability that such important projects (costing, say, over \$50,000) receive two or more audits.

The use management makes of the information obtained from the audits is important. Using audit results as a whip could cause negative reactions. Management should have the attitude of inquisitiveness about the causes of variances and their possible elimination rather than blaming the people responsible for the project. Nothing is helped by creating the impression that 100 percent performance is expected. A skillfully applied procedure of helping the analyst to improve his batting average will in the long run serve the company better.

⁵ Keith J. Bowman, "We Follow Our Capital Outlays," *N.A.A. Bulletin*, March 1958, p. 91.

TABLE VII
ACTUAL VERSUS ESTIMATED PROFITABILITY
All Three Companies
(Thousands of Dollars)

Company and Projects	Actual Savings or Profits	Estimated Savings or Profit	Actual as % of Estimate
<i>Company A</i>			
150 Projects selected from past nine years.....	\$3,870	\$3,910	99.1%
13 Projects from one plant, from past five years.....	188	189	99.5
36 Projects from one division, past year.....	237	461	51.4*
<i>Company B</i>			
71 Projects selected from past year†.....	\$ 297	\$ 387	76.7%
<i>Company C</i>			
60 Projects selected from past two years.....	\$ 233	\$ 243	95.8%
8 Projects from one plant, past year.....	33	38	86.7

* Explained as due to abnormally low volume in this division, extraordinary occurrence.

† Early study, at the start of audit procedure.

Source: Company Records.

Summary

The keynote of this article is emphasis on control, viewed to its fullest positive extent. Important selected checkpoints in the process of capital expenditure administration are uniformity and thoroughness of project preparation, timeliness and relevance of approval, observation of time as well as dollar limits in project execution, and meaningful follow-up.

When the decision is made by a company to administer capital outlays in an orderly fashion (and in the interest of profit maximization, this administration is mandatory), there arises the consequent need for well thought-out procedures for control. Otherwise the benefits of the system may prove to be illusory ones.

After you've done a thing the same way for two years, look it over carefully. After five years, look at it with suspicion. And after ten years, throw it away and start all over.

Alfred Edward Perlman

communications from readers...

From: David B. Houston
Assistant Professor of Insurance
University of California, Los Angeles

Re: "The Trend Toward More Equal Dis-
tribution of Income," by Lee Soltow,
California Management Review,
Summer, 1959, p. 89.

Professor Soltow in his recent article be-
gins his analysis of income distribution with
the following statement:

"There is ample evidence that the distri-
bution of income among low, moderate,
and high income groups in America has
become more equal today than it was 20
or 30 years ago."

While this statement is generally true, an
examination of the data indicates that certain
additional or qualifying statements are neces-
sary in order to indicate the true nature of
this "trend." In short, the distributions con-
tained in Table I show that while there was a
trend toward equality prior to the end of
World War II, there has been little or no
compression since that time.

The data in Table I reflect only the distri-
bution of money among consumer units and
give no evidence of the general improvement
in the standard of living since World War II.
One measure of economic progress is real
per-capita national income, which rose nearly
9 percent from 1946 to 1956—less than 1
percent per year. This improvement is not
evident in the income-distribution figures.
Further, capital gains and losses which would
redound primarily to the upper income
groups are not reflected in income figures,
and these are probably significant since
World War II. What Table I does show is
that income improvements were shared
equally by all income levels.

Thus, it would seem that, while the factors
discussed by Dr. Soltow (education, mobility,
greater homogeneity of the population, gov-
ernment action, corporate and union prac-
tices) may tend to compress the income dis-
tribution in the long run, they were not
operative in the postwar period, or, if so,
were counterbalanced by some other factor
or factors such that the net result was no
change.

TABLE I
PERCENT DISTRIBUTION OF FAMILY PERSONAL INCOME AMONG FIFTHS OF
CONSUMER UNITS-SELECTED YEARS

Fifths of Consumer Units Ranked by Size of Income	1929	1935-36	1941	1946	1951	1956
Lowest.....	13.0	4.1	4.1	5.0	5.0	5.0
2.....		9.2	9.5	11.1	11.3	11.3
3.....		14.1	15.3	16.0	16.5	16.5
4.....		19.0	20.9	21.8	22.3	22.3
Highest.....	54.0	51.7	48.8	46.1	44.9	44.9
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Top 5 percent.....	30.0	26.5	24.0	21.3	20.7	20.1

Source: U. S. Dept. of Commerce, *U. S. Income and Output 1958*, p. 44. Herman Miller, *Income of the American People* (New York: John Wiley & Sons, Inc., 1955), p. 109.

From: Lee Soltow
Associate Professor of Statistics
Ohio University

Re: David B. Houston's Comment

It is true that the long-run factors bringing greater equality of income have been counterbalanced in the short run by other factors. Explicit studies have shown that the distribution of income has remained relatively stable since World War II.¹

One of the reasons for this constancy can be found in a study of income classified by

¹ See Selma Goldsmith, "Size Distribution of Personal Income," *Survey of Current Business*, April 1958, pp. 11, 12.

factor payments.² Dividends, interest and rental income, and transfer payments have remained constant in percentage importance since World War II. There has been a shift only from business and professional income to wages and salaries. This pattern is in direct contrast to the previous period.

It is also true that the strongest long-run factor, education, has been at its weakest during the period because of the relatively small young-age group.³

² Lee Soltow, "Shifts in Factor Payments and Income Distribution," *American Economic Review*, June 1959.

³ Lee Soltow, "The Distribution of Income Related to Changes in the Distributions of Education, Age, and Occupations," an article accepted by *The Review of Economics and Statistics*.

From the Editor's Desk: An Appraisal

Our issue of the *California Management Review* for the Winter of 1959 carried an article entitled "Regional Business Forecasting," by Dr. Theodore A. Andersen, now on leave from University of California, Los Angeles, serving as the Commissioner of the

Economic Development Agency, State of California. The main objective of the article was to illustrate the use of a technique for forecasting regional business conditions.

We are now able to appraise the efficiency of this technique of forecasting by comparing the forecasted results with the actual results for the economy of Los Angeles. The results are shown in Table I below.

TABLE I

	Forecast made in December 1958 covering the year 1959	Actual Results for 1959
U. S. Employment.....	51.6 mil	51.9 mil
L. A. Employment.....	2.59 mil	2.597 mil
L. A. Employment as % of U. S.....	5.0	5.0
L. A. Personal Income Change Change from previous year.....	Up \$1.3 Bill	Up \$1.22 Bill
L. A. Retail Sales Change from previous year.....	Up \$750 Mil	Up \$838 Mil

The above results suggest that the methodology employed warrants the attention of

groups interested in techniques in Area Economic Forecasting.

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